

NETWORK WORLD

The Newsweekly of User Networking Strategies

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Users debate strategic net investments

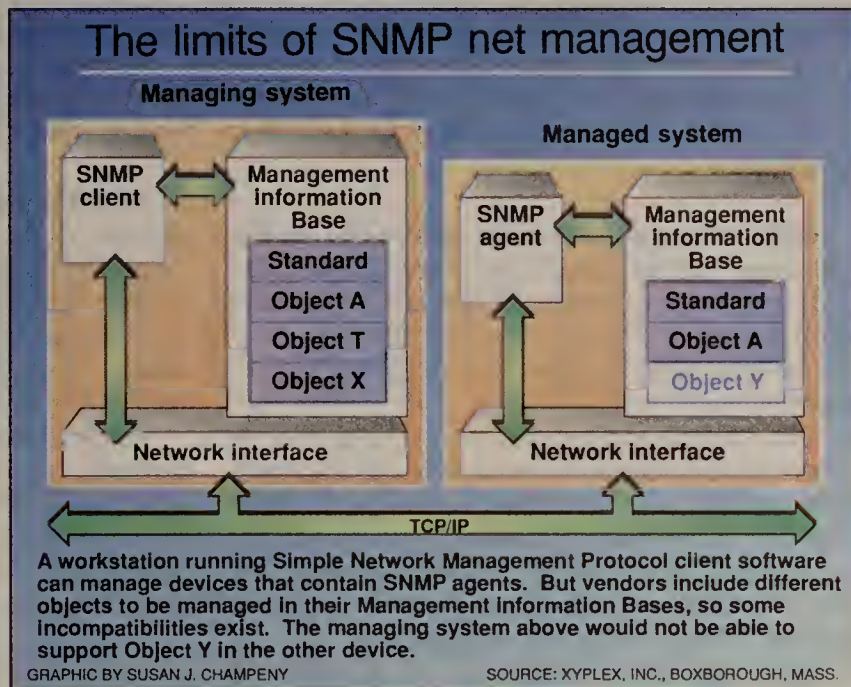
By Joe Panepinto
Staff Writer

NEW YORK — While some users allot considerable amounts of money and manpower to developing strategic network applications, others question the wisdom of such investments.

Companies that invest in strategic systems risk costly failure, say some users and analysts. Even if the application is successful, risk-averse competitors can copy it, usually at lower cost and in less time. That makes the prospect of trying to build a blockbuster network application less than attractive, they say.

"The sort of huge competitive advantage American Airlines [Inc.] got through SABRE is going to be a lot harder to come by because technological development has accelerated so much," said Larry Chait, a director at Arthur D. Little, Inc., a Cambridge, Mass.-based consultancy.

Other users acknowledge that investing in such applications involves risk, but they argue that it doesn't matter if competitors clone an application. Pioneering network systems can help a user win market share and customer loyalty that latecomers may not ever be able to take back. Building a reputation as a technology
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Customization of SNMP products obscures benefits

Vendor extensions to SNMP make products more powerful but raise users' interoperability concerns.

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — The growing popularity of the Simple Network Management Protocol (SNMP) as a management tool for TCP/IP nets is raising some complex issues for users because vendors are customizing their implementations of the standard.

The custom elements in SNMP already far outnumber the standard ones, and the end is nowhere in sight. These vendor-specific extensions make SNMP a much more powerful management tool, but they also create in-

teroperability problems that have to be sorted out.

An SNMP management station from one vendor might not support the SNMP extensions in a network device from another vendor (see graphic). Management activities would then be limited, at best, to the lowest common denominator — the functionality provided by the standard SNMP elements — and the user would not reap the benefits of the extensions.

"The buyer right now needs to be a little bit cautious," said Karl
(continued on page 6)

Government ISDN net gets first 10K lines

WITS net will support D.C.-based agencies, become the largest ISDN net installed to date.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — Chesapeake & Potomac (C&P) Telephone Co. last week cut over the first 10,000 lines of the federal government's Washington Inter-agency Telecommunications System (WITS), which is being billed as the nation's largest fully ISDN-capable network.

By 1992, the WITS net will consist of three dedicated AT&T 5ESS central office switches supporting 130,000 lines for 50 government agencies and judiciary offices in the Washington area. Eventually, an estimated 52,000 of those lines will support the Integrated Services Digital Network Basic Rate Interface (BRI).

Five buildings that house the General Services Administration, Department of Labor, Department of Justice and seven other agencies in downtown Washington were the first to be cut over to the network.

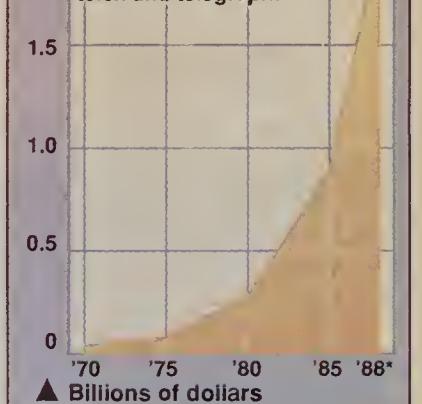
The ISDN capabilities will not be available until May, when 40,000 lines will have been put into service. New ISDN handsets are needed to make use of ISDN, and "when you cut something over this large, you try not to put in new handsets at the same time

you put in new switches," said George Patton, director of the WITS program for the GSA.

The GSA has opened an ISDN demonstration center in which agency employees can test appli-
(continued on page 6)

Losing ground

U.S. trade deficit for international telecommunications



U.S., Europe to investigate int'l rates

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — Regulatory officials in Europe and the U.S. have launched a series of investigations to determine if users are being systematically overcharged for international switched services.

Regulators in the Federal Communications Commission, the U.K.'s Office of Telecommunications and the European Commission have launched separate investigations to determine whether prices for international switched services unreasonably exceed provisioning costs, and if so, what should be done about it.

The FCC has been studying the issue since 1988, when it issued a report concluding that the U.S. trade deficit in international switched service revenue rose more than 20% per year from the
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NETLINE

CITICORP PULLS AT&T BIZ in retaliation for the carrier's move into credit cards. Page 2.

LIGHTING CO. CORNERS market with electronic order entry network. Page 2.

DEC BOLSTERS its DECrouter line with a new mid-range offering. Page 2.

AT&T UNWRAPS ISDN wares

that let users tie 3270 terminals to SNA controllers. Page 4.

BIG THREE carriers report healthy 1Q financials. Page 4.

AT&T PHOTONIC SWITCH is rolled out. Page 4.

ACCESSING YOUR NET with smart cards and biometrics can be as simple as saying, 'Open sesame.' Page 40.

FEATURE

Server upgrades offer big results at low costs

By Salvatore Salamone
Features Writer

There are many changes you can make to a server if you want to improve a local-area network's performance. The fourth test in the 1990 Network World/LanQuest Group LAN Test Series shows that significant performance improvements can be gained through relatively inexpensive upgrades to an existing server, such as swapping the network interface

card or increasing the random-access memory.

In some cases, additional performance gains can be obtained at no cost by simply increasing the amount of data in the packets sent out onto the network. The test assumed that the existing network was either an Ethernet or a token ring and that the user did not want to switch operating systems or invest in a new server.
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LAN
TEST
SERIES

Credit card causes AT&T to lose Citicorp business

AT&T pays high price for Universal Card when angered Citicorp awards \$30m account to MCI.

By Ellen Messmer
Washington Correspondent

NEW YORK — AT&T's entry into the credit card market has cost the carrier business in the financial services industry.

Just one week after the March 26 introduction of the AT&T Universal Card, Citicorp handed over \$30 million in telecommunications business from AT&T to MCI Communications Corp. in the form of a three-year service contract for Citibank Card Products Group.

A Citibank spokesman acknowledged the AT&T competitive threat as a factor in its decision to switch to MCI. Citibank is

particularly riled that AT&T hired away middle management from its credit card operation to support the Universal Card start-up.

"We needed experienced people," explained an AT&T spokeswoman. "Citicorp, being No. 1 in the business, naturally had a number of experts."

The \$30 million Citibank Card Products Group contract calls for MCI to provide data transmission, 800 services, and inbound and outbound voice services.

MCI, which previously supplied just one-sixth of the 56K bit/sec circuits in Citibank's data network linking the group's three

(continued on page 64)

Lighting co. gains market edge with order entry net

Better customer service cements leadership spot.

By Wayne Eckerson
Senior Writer

CONYERS, Ga. — Lithonia Lighting Co. has quietly built a sophisticated order entry network that has given the company a commanding advantage over its rivals.

Once a sleepy, regional company on the outskirts of Atlanta, Lithonia has grown into the nation's leading manufacturer of commercial and industrial lighting products with \$660 million in annual revenue and a 37% market share.

According to company officials, much of that growth is due to the firm's order entry network,

dubbed Light*Link, which lets Lithonia's independent sales agents and distributors submit orders, request price quotes, and check inventories in warehouses and factories.

Unlike its competitors, Lithonia handles virtually all orders and inquiries electronically, giving customers the information they need in a matter of minutes instead of hours or days.

And because Light*Link automates a labor-intensive process, Lithonia has sustained an average 15% annual growth rate without an increase in personnel.

"At this point, it would take

(continued on page 62)

New member of DECrouter line links up to 8 DECnets

By Jim Brown
Senior Editor

ATLANTA — Digital Equipment Corp. last week filled out its DECrouter line with a mid-range offering that links a single DECnet with as many as eight other local or remote DECnets.

DEC announced the DECrouter 250 here at the Supercomm '90 show. The device consists of hardware and software designed to route traffic between DECnet nodes that support DEC's Digital Data Communications Message Protocol, a data link-layer protocol that defines how data is transmitted between DECnet routers.

DECrouter 250 comes in three configurations, each of which

supports one local Ethernet link and multiple wide-area connections.

The first configuration supports links to eight other DECnets at 19.2K bit/sec. The second supports a 56K or 64K bit/sec link to another DECnet, as well as 9.6K bit/sec links to four other DECnets. The third supports 56K or 64K bit/sec links to two other DECnets.

The DECrouter 250 complements DEC's existing high-end DECrouter 2000, which supports a single Ethernet and either four 64K bit/sec, three 256K bit/sec or one T-1 wide-area link. It also complements the low-end DECrouter 100, which supports a sin-

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Briefs

Cisco to join frame relay race. Cisco Systems, Inc. is expected to announce today its plan to develop a frame relay interface between its routers and StrataCom, Inc.'s IPX FastPacket T-1 multiplexers. Cisco will become the third vendor, after Digital Equipment Corp. and Vitalink Communications Corp., to announce support for StrataCom's frame relay interface. The interface promises to let Cisco's router feed data to the IPX at up to T-1 speed and to provide routing capabilities that increase the speed of data transmissions across a wide-area backbone.

DEC avoids first-ever loss. Two months after warning that it might report its first-ever quarterly loss, Digital Equipment Corp. last week posted third-quarter earnings of \$24.9 million, down 90.2% from \$256.4 million reported for last year's quarter.

DEC's results for the fiscal 1990 third quarter included a \$150 million charge against earnings related to staff cuts. DEC's revenue for the quarter ended March 31 rose 3.9% compared to the corresponding quarter last year, from \$1.99 billion to \$2.07 billion. The company's domestic revenue grew from the year before for the first time in a year.

Ameritech to add more fiber. Ameritech last week announced that it will spend \$100 million over the next several years to add more fiber-optic cable to its network in major metropolitan areas,

providing businesses with diversified routing and direct high-speed links to central office switches.

Ameritech said it is already adding fiber in Columbus, Ohio, Cleveland, Indianapolis and Milwaukee. This summer, work will begin in Chicago, Detroit and Grand Rapids, Mich. According to company officials, the project will enable Ameritech to upgrade its fiber network in the early 1990s to support high-speed communications using Synchronous Optical Network technology, an emerging international standard for fiber communications.

RBHCs report earnings. Ameritech, Bell Atlantic Corp., Nynex Corp., Southwestern Bell Corp. and US West, Inc. all reported increased first-quarter earnings and revenue last week for the period ended March 31. Pacific Telesis Group and Bell-South Corp. reported lower earnings despite improved revenue.

Pacific Telesis posted a 17.4% drop in first-quarter earnings, down from \$317 million in the first quarter of 1989 to \$262 million. The carrier attributed this to new California regulations that require the regional Bell holding company to reduce rates by \$391 million per year while granting the company increased pricing and spending flexibility.

BellSouth reported a 5.9% decline in first-quarter earnings, from \$449.6 million last year to \$423.2 million. The drop was attributed to costs associated with an early retirement program, among other things.

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Network World wants you. If you have a news tip, please contact us. We'd also like to hear about unusual network applications and how you're optimizing your networks for performance or savings. Contact Editor John Gallant at (800) 622-1108, ext. 426, or through MCI Mail at 390-4868.

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NW4

AT&T unveils SNA/3270 line, ISDN telephone sets

The new 6544 Multifunction Cluster Controller comes with BRI for AT&T and IBM terminals.

By Bob Wallace
Senior Editor

ATLANTA — AT&T used the Supercomm '90 conference here last week to introduce a family of products that enable customers to use ISDN to tie IBM 3270-type terminals to local or remote Systems Network Architecture terminal controllers.

AT&T's SNA/3270 products include a new model of the company's 6544 Multifunction Cluster Controller that comes with an integral Primary Rate Interface (PRI) and multiple types of Basic Rate Interfaces (BRI) to support AT&T and IBM 3270 terminals.

The products can be used with AT&T's Integrated Services Digital Network-compatible Definity Generic 1 and 2 private branch exchanges or ISDN Centrex services provided from AT&T 5ESS central office switches to link 3270 terminals to cluster controllers within a building.

They can also be used in wide-area nets by using the PRI controller interface to support re-

mote terminals that are outfitted with BRI interfaces. This eliminates the need for controllers at the remote site.

BRI links provide two 64K bit/sec channels for voice or data communications and a 16K bit/sec channel for signaling. PRI provides 23 64K bit/sec voice

The products let 3270 terminals be located up to 18,000 feet from the ISDN switch.

▲▲▲

and data channels and a 64K bit/sec signaling channel over 1.544M bit/sec T-1 facilities.

In local configurations, the products enable 3270 terminals to be located up to 18,000 feet from the ISDN switch, which is

linked via a PRI line to the controller.

IBM 3270 terminals can be located as far as 5,000 feet from the controller.

The new products will be sold under the AT&T name and will be manufactured by the company for two years as part of AT&T's recent agreement to sell its Synchronous Terminal Products division to Memorex Telex N.V.

AT&T refused to divulge pricing for the new product family, which will not be generally available until later this year.

PRI controller

The new 6544 Multifunction Cluster Controller comes with a single ISDN PRI that enables the device to support up to 23 3270 terminals through an ISDN switch. The 6544 can support nine other terminals via direct coaxial cable connections, X.25 interfaces and RS-232 ports.

According to James Swinger, synchronous terminal products manager for AT&T, there is no difference in terminal performance with ISDN compared to IBM's method of connection.

On the host side of the controller, the device can support as many as four processors, according to Michael Fekerty, senior product planner for ISDN appli-

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AT&T shows off photonic net switch

By Bob Wallace
Senior Editor

ATLANTA — AT&T Network Systems Group demonstrated a prototype photonic switch at the Supercomm '90 show here last week that it plans to incorporate in a product within five years.

The switch, under development at AT&T Bell Laboratories since 1987, has a capacity of more than 1T bit/sec and is expected to hasten deployment of high-bandwidth services, including high-definition television (HDTV), multimedia conferencing and video on demand.

The prototype, a large tabletop photonic switch element composed of lens and light

sources, was controlled by an electronic processor. Unlike conventional switches, photonic switches switch light instead of electrons. Existing switches that support fiber-optic I/O must convert the signals to electricity before switching them.

AT&T Bell Labs calls the basic technology Free Space Photonics. The switching system's core is the first demonstrated application of the advanced technology, which was publicly announced last January, according to AT&T Network Systems.

Commitment to photonics

"What we wanted to do here this week was to continue to reinforce our commitment to photonic switching as a future line of business," said William Marks Jr., president of AT&T Network Systems.

Robert Lucky, executive director of research for AT&T Bell Labs' Communications Sciences (continued on page 62)

Big Three long-haulers say earnings up to snuff

AT&T's results were marginally hurt by Jan. glitch.

By Bob Brown
Senior Editor

AT&T, MCI Communications Corp. and US Sprint Communications Co. last week all reported earnings and revenue increases for the first quarter ended March 31, reflecting healthy demand for long-haul services.

AT&T reported earnings of \$668 million for the first quarter, up 12% from the first quarter of

carrier, MCI, reported earnings of \$156 million for the first quarter, up 18% from earnings of \$128 million in the first quarter of 1989. The company posted revenue of \$1.8 billion in the first quarter, up 20% from \$1.5 billion in revenue for the first quarter last year.

MCI had a busy first quarter; it announced a 25% investment in Infonet Services Corp., an international value-added data network provider, and purchased the physical assets of Western Union Corp.'s Advanced Transmission Systems Division, which offers private-line services.

US Sprint doubles income

United Telecommunications, Inc., the parent company of US Sprint, reported earnings of \$107.6 million for the first quarter of 1990, up 29% from \$76.4 million in the first quarter of 1989. Revenue grew 12.7%, to \$2 billion in the first quarter, up from \$1.8 billion in the first quarter last year.

US Sprint reported first-quarter operating income of \$85 million, more than double the \$35 million in operating income it posted in the first quarter last year. The long-haul carrier reported first-quarter revenue of \$1.2 billion, up 24% over the \$983.9 million for the first quarter last year.

During this year's first quarter, United Telecom said it plans to acquire by July GTE Corp.'s remaining 19.9% stake in US Sprint for \$500 million. It also plans to change its name to Sprint Corp.

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Teleport asks PUC to force PacBell to share local loop

Accuses Calif. carrier of stifling competition.

By Bob Brown
Senior Editor

NEW YORK — Teleport Communications Group last week petitioned the California Public Utilities Commission (PUC) to order Pacific Bell to provide local-loop access to the alternative access carrier.

The filing came a little more than a year after the New York Public Service Commission (PSC) ordered New York Telephone Co. to provide Teleport with access to the local exchange following a similar filing ("N.Y. Tel faces order to give local connections to rival," *NW*, Feb. 20, 1989).

In its April 16 filing with the California PUC, Teleport asked the agency for access to Pacific Bell switching facilities so Teleport could extend a line from its point of presence (POP) to the local carrier's central office. This would enable Teleport to use Pacific Bell's local circuits to reach customers' premises, rather than run lines from its POP directly to users' sites.

In its filing with the California PUC, Teleport said Pacific Bell refused to allow the extension of Teleport's network to a Pacific Bell central office. It also said Pacific Bell had frustrated the PUC's

efforts to promote competition in the local exchange market.

Access to Pacific Bell central office facilities would enable Teleport to provide service to such user facilities as automated teller machines, which do not generate enough traffic to warrant using a full high-speed link.

"Right now, in San Francisco, we can only offer you service if you have enough traffic for us to bring a fiber facility up through your riser and onto your floor," said Scott Bonney, director of regulatory affairs at Teleport. "That limits the range of customers we're able to attract."

Teleport, whose customers include financial firms and long-haul carriers that want to bypass the local exchange carrier or set up redundant links for disaster recovery purposes, recently began operating a fiber-optic net in San Francisco and is building another in Los Angeles that should be finished by year end.

The California market is attractive to Teleport because the financial communities in San Francisco and Los Angeles are jockeying to position themselves as the gateway into Japan's financial market, Bonney said.

Teleport's appeal to the California PUC follows roughly nine

months of unsuccessful negotiations with Pacific Bell to resolve the issue, Bonney said. "Pacific Bell negotiated in good faith and was more enlightened on the subject than New York Telephone was, but we never came up with a satisfactory resolution," he said.

Creating a clone

Bonney said Teleport is trying "to create a clone" of the New York network in both San Francisco and Los Angeles. As a result of the New York PSC ruling, Teleport has so far interconnected fiber into two New York Telephone central offices so far and is now conducting joint troubleshooting tests.

However, Teleport has yet to pass along the benefits of these changes to users as a result of alleged "stalling tactics" by New York Telephone that Teleport plans to address in a complaint to be filed with the New York PSC this week, Bonney said.

Nevertheless, "walking through the minefield in New York without losing any limbs," as Bonney described Teleport's negotiations with New York Telephone, should give Teleport the experience it needs to succeed in California, he said. It could also pave the way for other alternative access carriers to interconnect and compete with Pacific Bell.

A spokesman for Pacific Bell would not comment on the Teleport filing because the regional carrier had not had a chance to review the complaint.

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Credit checking company quits AT&T for MCI

By Anita Taff
Washington Bureau Chief

DETROIT — Lured by substantial cost savings, Comp-U-Check, Inc., a check and credit card validation company here, has agreed to give all of its long-distance traffic to MCI Communications Corp.

The company previously split its traffic evenly between MCI and AT&T, but in an effort to achieve greater network efficiencies and cut service costs, Comp-U-Check decided to settle on a single carrier.

"When I came to the company, we had direct-dial 800 service and we were paying 22 cents a minute; therefore, we were being charged 11 cents for these short point-of-sale calls," said Martin Durbec, president of Comp-U-Check. With the new network, those same calls cost 3 to 4 cents per minute.

Comp-U-Check, a company with \$10 million in revenue and 135 employees, has more 800 and 1+ trunks (a total of about 180) than employees.

"We have a relatively simple operation with the mass of our traffic running at 300 baud," Durbec said. "But [the network] is working at a very high volume, and we have a real need to control the costs of a transaction."

Comp-U-Check handles credit and check validations for department stores, discount stores, hotels and motels seven days a week, 24 hours a day.

The company uses 800 and 1+ service to provide customer service, handle validation transactions and support a company unit that performs collections on delinquent bills. It handles about 300,000 to 400,000 inbound calls on 800 numbers and 50,000 to 75,000 1+ calls each month.

The firm has a total of 12 800 numbers, each of which supports a different business function, such as POS transactions, customer service and problem resolution with retailers.

A large number of the 800 calls are 4- to 15-sec POS validations, but the network also handles a number of longer 800 and 1+ calls.

These opposing traffic demands led to a network in which separate facilities were being used for each business function, according to Chris Styes, the MCI branch manager handling Comp-U-Check's account. This meant the firm was missing out on possible network efficiencies, she said.

"By looking at the company's functions in an aggregate sense, we could take care of both their verification and collection needs" less expensively, Styes said.

Last April, Durbec decided to redesign the network and signed a five-year, multi-million dollar agreement with MCI. The new network began operation earlier this month.

Durbec was able to cut costs for communications due primarily to three aspects of the network's design.

First, Comp-U-Check specified that it wanted to collocate its operations — such as its computer room and telemarketing department — in the same building containing MCI's point of presence. Durbec estimated that the company will save \$60,000 per year by connecting directly to

MCI's switch, bypassing Michigan Bell Telephone Co.'s facilities and eliminating termination charges.

Second, since Comp-U-Check has switched all of its traffic to MCI, it now qualifies for bigger volume discounts.

But perhaps the most significant cost savings will result from the use of Dialed Number Identification Service (DNIS). MCI's DNIS capability allows Comp-U-Check to terminate all of its 800 traffic on one trunk group, consolidating both short POS and longer customer service calls.

Because MCI bills in 30-sec increments and most POS calls are significantly shorter than that, Durbec's firm was overpaying for transmission time with the older MCI services the new contract replaced.

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Firms with expert systems work to keep skilled net staff involved

By Jim Brown
Senior Editor

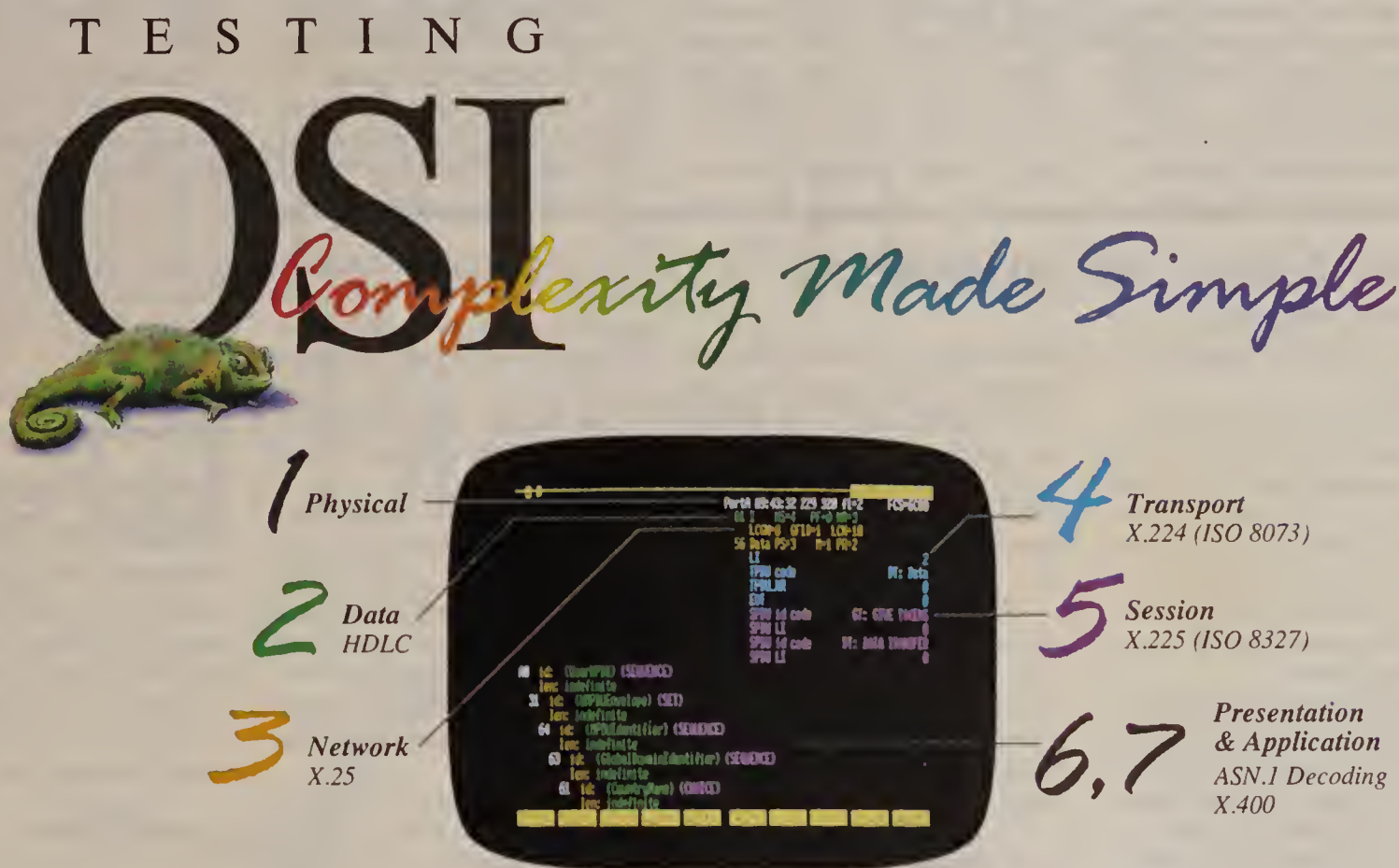
While expert systems can reduce network staffing needs by automating responses to minor glitches, they often leave companies wondering how to keep experienced network operators from becoming like the lonely Maytag repairman.

In order to keep human experts from getting bored and leaving their jobs, some companies are promising to retrain these valuable workers to program and maintain expert systems.

"Once we go to automation, the expert system has to be kept up-to-date," said Samar Patel, communications analyst in charge of network management coordination at United Parcel Service, Inc. in Paramus, N.J.

Other companies said they hope the introduction of expert systems to monitor and respond to abnormal network conditions would actually help retain top network operators by freeing them to tackle more complex network problems.

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See The FAXNet Form on Page #67

Government ISDN net gets lines

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cations supporting simultaneous voice and data transmission. Four BRI lines have been set up in the demonstration center, one of which the GSA has been using to aid the cutover.

Bill Stacy, a GSA engineer in the WITS Operation Center, said his team was using the ISDN Calling Line Identification capability to identify lines when phones were moved.

Cutover of the initial 10,000 regular lines was not without incident. The GSA's WITS administrative office said agencies reported various problems, such as calls not going through, mislabeled phones, misprogrammed speed-dialing numbers and problems with access to the Federal Telecommunications System (FTS) 2000 network, the government's long-distance network.

"It's normal to have problems when you cut over something like this," Patton said. Some of the difficulties, he noted, can be traced to sources outside of WITS.

Installation of WITS required new phone numbers. Although the area code and the last four digits of most numbers remained the same, C&P Telephone assigned two new local exchanges, 501 and 208, to the GSA.

Some phone companies and private net users trying to communicate with WITS were experiencing difficulties because they had not upgraded their switches to recognize the new exchanges.

The 10-year WITS contract, awarded Jan. 12, 1989, and valued at more than \$220 million, calls for C&P Telephone to replace analog Centrex switches

with three dedicated AT&T 5ESS switches and several remote optical switching modules. AT&T is the primary subcontractor for the project.

Bill Graeff, WITS project director for C&P Telephone, said WITS is the nation's largest ISDN system announced to date. He said that if WITS were a telephone company, it would be the 22nd largest in the U.S. in terms of the number of telephone lines.

To serve the network's users, C&P Telephone and AT&T will man the WITS Operation Center near a GSA office in Washington. The center will be both a business office and a switch center to handle the government's needs as a single point of contact for WITS.

The government views WITS as a showcase network and has gone on record stating that the new system will save the government more than \$40 million during its 10-year life. **■**

Users debate net investments

continued from page 1

leader also has its benefits, they contend.

According to Eric Clemons, a professor in the department of decision sciences at The Wharton School at the University of Pennsylvania in Philadelphia, network executives must be brutally honest in evaluating the potential business advantages of a proposed application.

Clemons has developed a decision matrix to help users decide whether to innovate or wait ("Paper offers guide for net investments," *NW*, July 31, 1989).

He says companies should undertake expensive network projects only if the resulting developments pose a barrier to entry for competitors. Such barriers include the development of patentable products, such as software that can't be copied, or exclusive arrangements with customers that lock out rivals.

If the application or technology can be easily cloned, a user might be better off waiting for another company to develop and test the system in order to avoid significant up-front costs, or the company could develop the application in partnership with others in the industry.

If blockbuster business advantages are few and far between, why do users invest in expensive development projects?

Users point to the value of increased market share as the reason. They say it is not how long a company maintains an edge in technology that matters, but how much market share it can secure by being first.

An application may be copied by a competitor, but market share advantages or customer loyalty gained in the first months of its use can provide a business edge that lasts for years.

"Stealing market share back is a lot harder than attracting it in

the first place," said John Wilson, manager of advertising systems at The Goodyear Tire & Rubber Co.

Building a reputation as an innovator can also go a long way to winning, and keeping, customers.

"We have to do it because our customers expect us to come out with new technological advances," said John Russell, vice-president and director of corporate communication at Banc One Corp. in Columbus, Ohio. Banc

"Stealing market share back is a lot harder than attracting it in the first place," said Goodyear's John Wilson.



One installed the first automated teller machine more than 20 years ago and continues to invest heavily in network development.

Although ATM technology has been widely duplicated, Russell maintains that Banc One's continual investment in developing technological solutions to business problems has paid off in a number of ways.

One advantage is that Banc One has built a reputation as an innovative problem solver, helping to attract not only customers but also talented personnel. He called Banc One's reputation a major factor in its growth into a 750-branch bank with more than \$38 billion in assets.

"We think being a pioneer has given us visibility that a bank of

our size normally would not get," Russell said. "It also helps build esprit de corps internally. Everyone wants to play on a winning team."

But Russell doesn't recommend Banc One's strategy for everyone.

Most companies don't have the free-form management structure of Banc One, which makes the implementation of network ideas possible, he said. For example, Banc One supports an internal "greenhouse group" dedicated to finding and implementing new ideas.

Russell said senior executives also realize that not all investments in technology will pay off. For example, Banc One was an early pioneer in the now moribund home-banking industry, sinking millions of dollars into a system that never paid dividends.

"The old story is true — pioneers are more apt to get the arrow in the back," Russell said. "But we've gotten back more from innovation than we've risked."

Walter Ulrich, a consultant at Arthur D. Little, agrees. "If you get market share by continually applying technology to business practices, it impedes your competitors. That creates a long-term advantage."

According to Max Hopper, senior vice-president of information systems at American Airlines, Inc. and one of the original architects of the SABRE computer reservation system, major investments in strategic systems are only worthwhile if a company is committed to constantly improving its system.

Although most airlines offer applications similar to those offered by SABRE, they all remain one step behind American Airlines in applying the technology, says Hopper. "You have to constantly keep leapfrogging yourself or someone is going to leapfrog you." **■**

IRS awards US Sprint largest FTS 2000 pact

WASHINGTON, D.C. — In the single largest award to date under the government's Federal Telecommunications System (FTS) 2000 telecommunications contract, US Sprint Communications Co. last week said the Internal Revenue Service has signed up for more than \$450 million in 800 services over the next 10 years.

The IRS, which is part of the Department of the Treasury, intends to use the 800 service to offer nationwide taxpayer assistance.

Besides basic interstate 800 service, the IRS will receive enhanced 800 services, including time-of-day, day-of-the-week and call distribution routing.

A US Sprint spokesman said the services will be installed nationwide in IRS offices starting in the fourth quarter of this year.

US Sprint already provided switched voice service to the IRS, as well as intra-agency 800 service. Under provisions of the FTS 2000 contract award, US Sprint is the sole telecommunications service provider for the IRS.

Currently, the IRS uses AT&T's 800 service offerings, but under the mandatory-use provision in the FTS 2000 contract, all IRS voice services must be supplied by US Sprint.

AT&T said it expects to pick up the lost business with other U.S. agencies it serves under the contract.

In December 1988, the General Services Administration split the award of the mammoth \$25 billion FTS 2000 contract, with US Sprint winning 40% and AT&T winning 60% of agency requirements.

— Ellen Messmer

Customization obscures benefits

continued from page 1

Auerbach, vice-president of Epilogue Technology Corp. in Capitola, Calif., which licenses an implementation of SNMP to companies that are developing network management products.

The components

SNMP is implemented in two components: a client piece that runs in the management host — typically a Unix-based workstation — and an agent that resides in the device to be managed, such as a gateway or router. The two programs communicate with each other via a User Datagram Protocol that runs on top of Transmission Control Protocol/Internet Protocol.

SNMP can be used to monitor network performance and status, control operational parameters, and report, analyze and isolate faults. For example, SNMP defines a way to observe traffic on a remote Ethernet segment and turn off a defective Ethernet controller.

The interoperability problems involve the Management Information Base (MIB). Clients and agents use objects within MIBs to define the set of variables, controls and test points that a complete TCP/IP implementation is expected to support.

SNMP evolved from the Simple Gateway Management Protocol (SGMP), which was developed to manage gateways in the Internet. Consequently, the standard SGMP MIB contained only 110 objects, most of which had to do with IP parameters and gateway issues. This MIB remained un-

changed when SGMP was expanded into SNMP, and it soon became clear that it was sorely lacking. As an example, Kishore Tarachand, senior product manager for network management at Hughes Lan Systems in Mountain View, Calif., said, "There are only four alarms in the standard MIB, and each of our agents has eight alarms."

The forthcoming MIB II, being developed by the Internet's SNMP committee, will extend the standard MIB by about 60 objects, but that will still fall short of vendor and user needs. Meanwhile, vendors have been furiously developing MIB extensions, and there are more than 500 of these vendor-specific objects, Tarachand said.

"The place where SNMP really becomes unglued is that each vendor can implement extensions to the standard MIB," said Bob Stewart, network architect for Xyplex, Inc., a Boxborough, Mass., developer of TCP/IP and Local Area Transport (LAT) communications services. A particular vendor's management station may or may not be able to deal with those extensions.

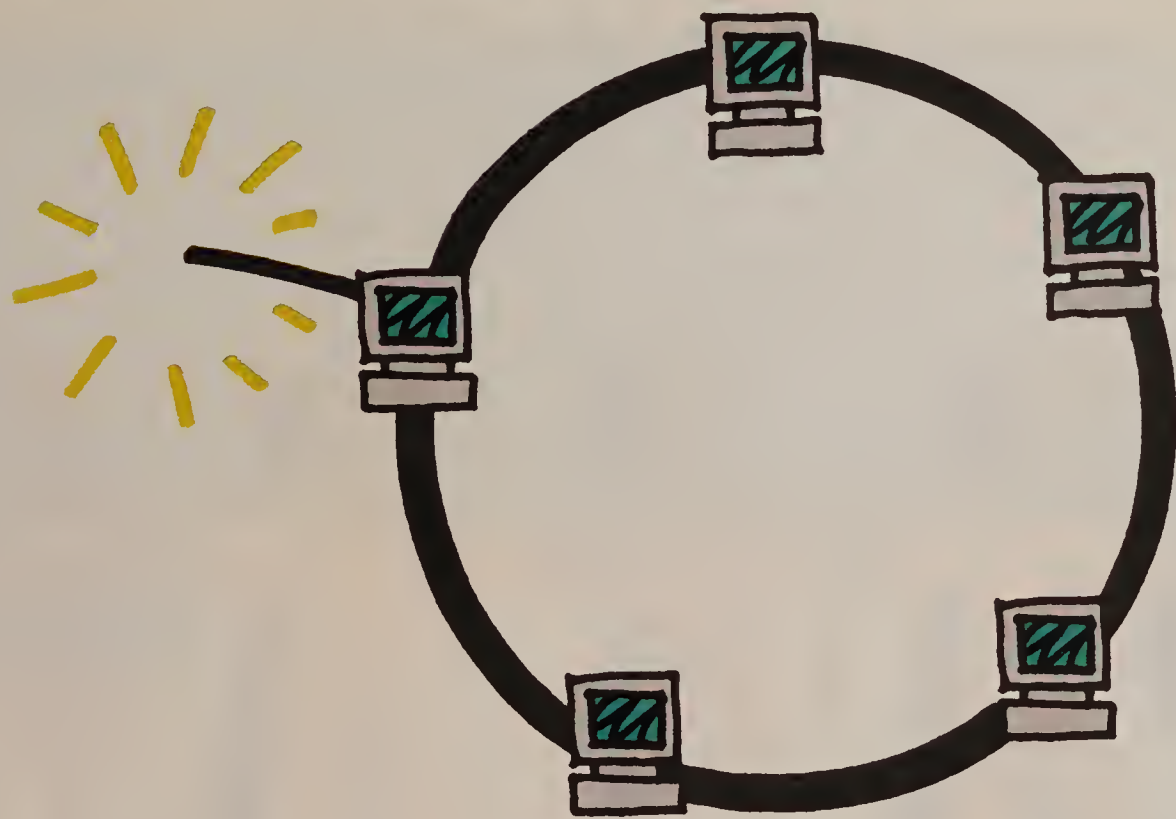
Groups of vendors are forming MIB-extension alliances to ensure that the participating companies' management systems and agent devices work together. That should ensure a measure of interoperability, but it is hardly the cross-industry plug-and-play compatibility some envisioned.

"We're in the period of the MIB wars," Auerbach said.

David Langlais, director of product marketing at The Wolongong Group, Inc. in Palo Alto, Calif., said he doesn't like this state of affairs.

(continued on page 61)

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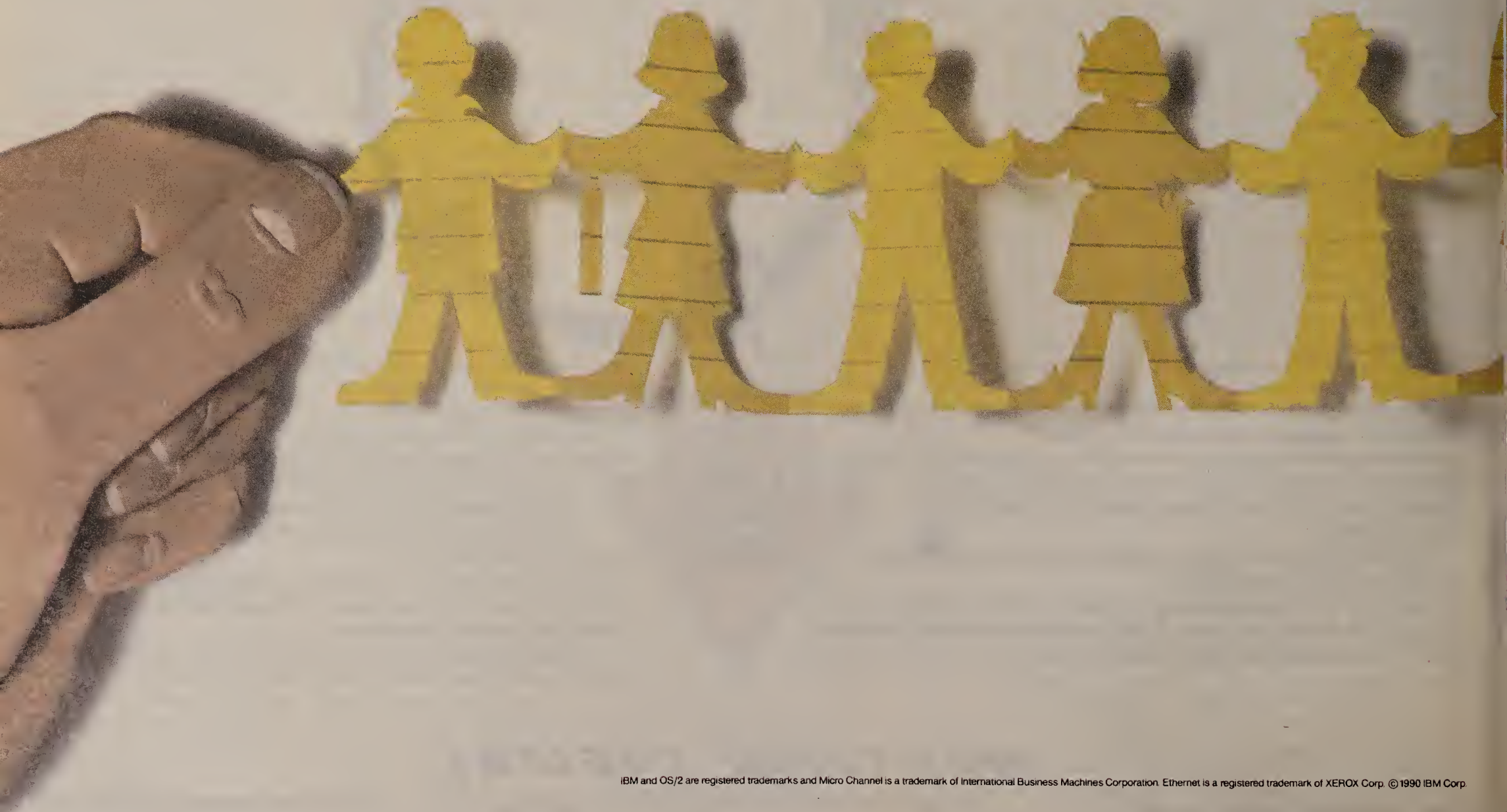
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C. Please Answer ALL Questions, Sign & Date the Form.

1 Industry: (check one only)

- 01. ☐ Manufacturers (other than computer/communications)
- 02. ☐ Finance/Banking
- 03. ☐ Insurance
- 04. ☐ Real Estate
- 05. ☐ Healthcare Services
- 06. ☐ Legal
- 07. ☐ Hospitality
- 08. ☐ Retail/Wholesale Trade
- 09. ☐ Transportation
- 10. ☐ Utilities
- 11. ☐ Education
- 12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
- 13. ☐ Government State/Local
- 14. ☐ Government Federal
- 15. ☐ Military
- 16. ☐ Aerospace
- 17. ☐ Consultants (independent)
- 18. ☐ Carriers
- 19. ☐ Interconnects
- 20. ☐ Manufacturers (Computer/Communications)
- 21. ☐ VAR/VAD/Systems House
- 22. ☐ Distributor, Computer Related
- 23. ☐ Distributor, Communications Related
- 24. ☐ Other

2 Job function: (check one only)

- 1. ☐ Networking Management (Responsible for both voice & data)
- 2. ☐ MIS Management (VP, Dir., Department Head)
- 3. ☐ Corporate Management (Chairman, President, Owner, General Manager, CEO, CIO, VP)
- 4. ☐ Data Communications Management (Responsible for data only)
- 5. ☐ Telecommunications Management (Responsible for voice only)
- 6. ☐ Financial Management
- 7. ☐ Engineering Management
- 8. ☐ Consultant (Independent)
- 9. ☐ Other

3 What is the scope of your involvement in purchase decisions for Network/Communications products + services? (check one only)

- 1. ☐ Enterprise Wide (Organization/Subsidiary/Division)
- 2. ☐ Multi Enterprise (Consultants)
- 3. ☐ Department Wide

4 What is the total number of sites for which you have purchase influence?

- 1. ☐ 100+
- 2. ☐ 50-99
- 3. ☐ 20-49
- 4. ☐ 10-19
- 5. ☐ 2-9
- 6. ☐ 1

5 Your primary responsibility: (check one only)

- 1. ☐ Both Data + Voice
- 2. ☐ Data Networking Only
- 3. ☐ Voice Networking Only
- 4. ☐ None

6 Which transmission media do you use in your network: (check all that apply)

- Public:
- 01. ☐ Switched-Based (DDD, Wats, Megacom, etc.)
 - 02. ☐ Leased Line (not including T-1)
 - 03. ☐ T-1
 - 04. ☐ Fractional T-1
 - 05. ☐ T-3/SONET
 - 06. ☐ Broadband
 - 07. ☐ ISDN
 - Private:
 - 08. ☐ Satellite
 - 09. ☐ Microwave
 - 10. ☐ Fiber Optic

7 Is your network: (check all that apply)

- LOCAL AREA NETWORK
- 1. ☐ Local (within building)
 - 2. ☐ Local (in a campus environment)
 - 3. ☐ International
 - 4. ☐ National
 - 5. ☐ Regional (several states)
 - 6. ☐ Metropolitan
- WIDE AREA NETWORKS

8 What is your network architecture? (check all that apply)

- 1. ☐ SNA
- 2. ☐ DECNET
- 3. ☐ OSI
- 4. ☐ GOSIP
- 5. ☐ MAP/TOP
- 6. ☐ TCP/IP
- 7. ☐ DCA (UNISYS)
- 8. ☐ OTHER

9 What is your LAN Operating System? (check all that apply)

- 01. ☐ 3COM (3+, 3+open)
- 02. ☐ LOCAL TALK (APPLETALK)
- 03. ☐ BANYAN (VINES)
- 04. ☐ DCA (IRMALAN)
- 05. ☐ IBM (LAN Server)
- 06. ☐ IBM (PC LAN PROGRAM)
- 07. ☐ MICROSOFT (LAN MANAGER)
- 08. ☐ UNGERMAN BASS (NET/1)
- 09. ☐ NOVELL (NETWARE)
- 10. ☐ TOPS
- 11. ☐ PROTEON (PRONET)
- 12. ☐ OTHER

10 What is your LAN environment? (check all that apply)

- 1. ☐ 4M TOKEN RING
- 2. ☐ 16M TOKEN RING
- 3. ☐ ARCNET
- 4. ☐ ETHERNET
- 5. ☐ STARLAN
- 6. ☐ FDDI
- 7. ☐ LOCALTALK
- 8. ☐ OTHER

11 Which operating systems do you utilize? (check all that apply)

- 1. ☐ IBM DOS (VSE)
- 2. ☐ UNIX
- 3. ☐ OS/2
- 4. ☐ OS/2 Extended Edition
- 5. ☐ MVS
- 6. ☐ VM
- 7. ☐ VMS
- 8. ☐ XENIX
- 9. ☐ PICK
- 0. ☐ OTHER

12 Please indicate by vendor the number of mainframes/minicomputers installed in your network.

VENDOR	MAINFRAMES		MINIS
	A	B	
01. DEC			
02. IBM			
03. AMDAHL			
04. AT&T			
05. BULL HN IS			
06. NCR			
07. DATA GENERAL			
08. WANG			
09. HEWLETT PACKARD			
10. PRIME			
11. TANDEM			
12. UNISYS			
13. CONTROL DATA			
14. OTHER			

13 Please indicate by vendor the number of microcomputers/workstations:

- A. Presently installed in your network.
B. The approximate quantity you plan to install in the next 12 months.

MICROCOMPUTER/ WORKSTATION/ VENDOR	PRESENTLY INSTALLED		PLAN TO INSTALL NEXT 12 MONTHS
	A	B	
01. PCs based on 80286 chip			
02. PCs based on 80386 chip			
03. PCs based on 80486 chip			
04. 8086/8088			
05. Macintosh			
06. RISC-based workstations			
07. UNIX-based workstations			

14 What is your planned PC standard? (check all that apply)

- 1. ☐ EISA
- 2. ☐ MCA
- 3. ☐ NUBUS (MACINTOSH)

15 For which areas outside of the U.S. do you have purchasing influence? (check all that apply)

- 1. ☐ Europe
- 2. ☐ Asia
- 3. ☐ South America
- 4. ☐ Australia
- 5. ☐ Middle East

16 Check ALL that apply in columns A and B

- A) I am presently involved in the purchase process for the following products/services:
- B) I plan to purchase the following products/services in the next 12 months:

Presently Involved	Plan to Purchase
A	B
01. <input type="checkbox"/>	LOCAL AREA NETWORKS:
02. <input type="checkbox"/>	Local Area Networks
03. <input type="checkbox"/>	LAN Servers
04. <input type="checkbox"/>	LAN Services
05. <input type="checkbox"/>	Cables, Connectors, Baluns
06. <input type="checkbox"/>	Bridges, Routers, Gateways
07. <input type="checkbox"/>	UPS
	LAN Storage Devices
A	B
08. <input type="checkbox"/>	COMPUTERS/PERIPHERALS:
09. <input type="checkbox"/>	Micros
10. <input type="checkbox"/>	Minis
11. <input type="checkbox"/>	Mainframes
12. <input type="checkbox"/>	Front End Processors
13. <input type="checkbox"/>	Terminals
14. <input type="checkbox"/>	Laptops
15. <input type="checkbox"/>	Printers
16. <input type="checkbox"/>	Work Stations
	Cluster Controllers

Presently Involved	Plan to Purchase
A	B
17. <input type="checkbox"/>	SOFTWARE:
18. <input type="checkbox"/>	Network Management
19. <input type="checkbox"/>	Micro to Mainframe
20. <input type="checkbox"/>	Network Security
21. <input type="checkbox"/>	Call Accounting
22. <input type="checkbox"/>	Distributed DBMS
23. <input type="checkbox"/>	Communications Software
24. <input type="checkbox"/>	Applications Software
25. <input type="checkbox"/>	Network Operating Systems Software
26. <input type="checkbox"/>	EDI Software
	E-Mail Software

Presently Involved	Plan to Purchase
A	B
27. <input type="checkbox"/>	DATA COMMUNICATIONS:
28. <input type="checkbox"/>	Modems (over 9.6kbps)
29. <input type="checkbox"/>	Modems (under 9.6kbps)
30. <input type="checkbox"/>	T-1 Multiplexers
31. <input type="checkbox"/>	T-3 Multiplexers
32. <input type="checkbox"/>	Fractional T-1 Multiplexers
33. <input type="checkbox"/>	Data Switches
34. <input type="checkbox"/>	Matrix Switches
35. <input type="checkbox"/>	Packet Switches
36. <input type="checkbox"/>	Protocol Converters
37. <input type="checkbox"/>	Network Management Systems
38. <input type="checkbox"/>	Terminal Emulation Boards
39. <input type="checkbox"/>	Facsimile Machines
40. <input type="checkbox"/>	Diagnostic Test Equipment
41. <input type="checkbox"/>	DSU/CSU
42. <input type="checkbox"/>	Data Security
43. <input type="checkbox"/>	Data Compression Equipment
44. <input type="checkbox"/>	Network Adapter Boards
45. <input type="checkbox"/>	Microwave
	Messaging Software
A	B
46. <input type="checkbox"/>	TELECOMMUNICATIONS:
47. <input type="checkbox"/>	PBXs (over 1000 lines)
48. <input type="checkbox"/>	PBXs (200 - 1000 lines)
49. <input type="checkbox"/>	PBXs (under 200 lines)
50. <input type="checkbox"/>	Key Systems
51. <input type="checkbox"/>	Automatic Call Distributors
52. <input type="checkbox"/>	Voice Messaging Systems
	Video Teleconferencing Systems
A	B
53. <input type="checkbox"/>	SERVICES:
54. <input type="checkbox"/>	Switched Voice
55. <input type="checkbox"/>	Dedicated Leased Line
56. <input type="checkbox"/>	T-1
57. <input type="checkbox"/>	T-3
58. <input type="checkbox"/>	Digital Data
59. <input type="checkbox"/>	Packet Switched
60. <input type="checkbox"/>	Centrex
61. <input type="checkbox"/>	Central Office Lan
62. <input type="checkbox"/>	Satellite
63. <input type="checkbox"/>	On-Line Information
64. <input type="checkbox"/>	ISDN
65. <input type="checkbox"/>	E-Mail
	VSAT

17 Estimated value of networking equipment and services:

A: Which you helped specify, recommend or approve in the last 12 months?

B: Which you plan to help specify, recommend or approve in the next 12 months?

- | | |
|-----------------------------|---|
| A | B |
| 1. <input type="checkbox"/> | <input type="checkbox"/> \$100 million and over |
| 2. <input type="checkbox"/> | <input type="checkbox"/> \$50 - \$99.9 mill. |
| 3. <input type="checkbox"/> | <input type="checkbox"/> \$25 - \$49.9 mill. |
| 4. <input type="checkbox"/> | <input type="checkbox"/> \$20 - \$24.9 mill. |
| 5. <input type="checkbox"/> | <input type="checkbox"/> \$10 - \$19.9 mill. |
| 6. <input type="checkbox"/> | <input type="checkbox"/> \$5 - \$9.9 mill. |
| 7. <input type="checkbox"/> | <input type="checkbox"/> \$1 - \$4.9 mill. |
| 8. <input type="checkbox"/> | <input type="checkbox"/> \$500,000 - \$999,999 |
| 9. <input type="checkbox"/> | <input type="checkbox"/> Under \$500,000 |

18 Estimated gross annual revenue of your entire company/institution: (check one only)

- 1. ☐ over \$10 billion
- 2. ☐ \$1 to \$9.9 bill.
- 3. ☐ \$500 to \$1 bill.
- 4. ☐ \$100 to \$499.9 mill.
- 5. ☐ \$50 to \$99.9 mill.
- 6. ☐ \$10 to \$49.9 mill.
- 7. ☐ \$5 to \$9.9 mill.
- 8. ☐ under \$5 mill.

19 Estimated number of employees for your entire corporation:

- 1. ☐ over 10,000
- 2. ☐ 5,000 - 9,999
- 3. ☐ 2,500 - 4,999
- 4. ☐ 1,000 - 2,499
- 5. ☐ 500 - 999
- 6. ☐ under 500

20 Which of the following ISDN products do you plan to purchase in the next 12 months? (check all that apply)

- 1. ☐ Basic Rate Interface Terminal Adapters
- 2. ☐ Primary Rate Interface Equipment
- 3. ☐ Voice/Data terminals
- 4. ☐ Voice-only terminals
- 5. ☐ Data-only terminals

21 From which of the following vendors will you consider buying your PBX/Central Office Switch? (check all that apply)

A	B
PBX	COS
A <input type="checkbox"/>	<input type="checkbox"/> AT&T
B <input type="checkbox"/>	<input type="checkbox"/> ALCATEL
C <input type="checkbox"/>	<input type="checkbox"/> ERICSSON
D <input type="checkbox"/>	<input type="checkbox"/> FUJITSU
E <input type="checkbox"/>	<input type="checkbox"/> HARRIS
F <input type="checkbox"/>	<input type="checkbox"/> HITACHI
G <input type="checkbox"/>	<input type="checkbox"/> IRLM
H <input type="checkbox"/>	<input type="checkbox"/> INTECOM
I <input type="checkbox"/>	<input type="checkbox"/> MEMOREX TELEX
J <input type="checkbox"/>	<input type="checkbox"/> MITEL
K <input type="checkbox"/>	<input type="checkbox"/> NEC
L <input type="checkbox"/>	<input type="checkbox"/> NORTHERN TELECOM
M <input type="checkbox"/>	<input type="checkbox"/> SAMSUNG
N <input type="checkbox"/>	<input type="checkbox"/> SIEMENS
O <input type="checkbox"/>	<input type="checkbox"/> STROMBERG-CARLSON
P <input type="checkbox"/>	<input type="checkbox"/> TOSHIBA
Q <input type="checkbox"/>	<input type="checkbox"/> OTHER

NETWORK WORLD

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(continued on next column)

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

The European market for computer and communications equipment service and support will surpass \$30 billion in revenue by 1993, based on annual growth rates of 7%, according to The LedgeWay Group, a Lexington, Mass.-based division of Dataquest, Inc. The \$29 billion U.S. market is expected to increase by 4.5% annually through 1993.

People & Positions

StrataCom, Inc., a Campbell, Calif.-based fast packet equipment vendor, last week announced three high-level appointments.

Richard Lowenthal was named to the newly created position of vice-president of research and development. Previously, Lowenthal was vice-president of engineering at Stardent Computer in Newton, Mass. The responsibilities assumed by Lowenthal have been shared until now by **Dick Moley**, StrataCom president, and **Gaymond Schultz**, the company's vice-president of systems engineering.

Steven Haley was appointed to the newly created position of managing director of European Operations. Previously, Haley was managing director of European operations at Bytex Corp. StrataCom currently sells its products to Europe through Plessey-Telenet but plans to form its own sales staff there eventually.

Bill Bauer was named general manager for StrataCom's Western Region, where he will be responsible for direct sales. Bauer previously was a branch manager at Timeplex, Inc. He will replace **Scott Kriens**, who was promoted to the new position of director of U.S. sales. ■

Putting it all together

MCI/Telecom*USA merger (valued at \$1.25b)

	MCI Communications Corp.	Telecom*USA, Inc.
Based:	Washington, D.C.	Atlanta
1989 revenue:	\$6.5 billion	\$713 million
Market share:	13%	1.4%
Merger benefits:	Expands customer base in mid-range business market, expands fiber optics in network and gains voice mail and advanced 800 service.	Becomes part of second-largest long-distance company. Offers customers advanced MCI services, such as Vnet virtual network.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCES: MCI AND TELECOM*USA

MCI acquisition may ravage small carriers

Telecom*USA deal could result in 'feeding frenzy' by Big Three to snap up lower tier innovators.

By Bob Brown
and Ellen Messmer
Network World Staff

WASHINGTON, D.C. — The merger of MCI Communications Corp. and Telecom*USA, Inc. could have far-reaching implications for lower tier carriers, industry observers said last week.

The merger is expected to pave the way for other carriers — most notably US Sprint Communications Co. — to raid the low-end long-haul market and snap up the most attractive remaining regional carriers.

Such a consolidation of the lower tier long-distance industry would likely create an environment in which the three leading interexchange carriers could dictate rates and service features without the threat of smaller companies stealing business with technical or market innovations, observers said.

"I think this could kick off a feeding frenzy," said Roy Wilkens, president of Williams Telecommunications Group, Inc. (WTG), a Tulsa, Okla.-based second-tier long-haul carrier that competes with Telecom*USA yet provides it with private-line services. "I expect that US Sprint is looking at the fifth, sixth and seventh long-distance carriers [for a possible acquisition or merger]."

MCI announced it will complete its \$1.25 billion buyout of Telecom*USA later this year. The deal is expected to boost MCI's competitive position against AT&T and US Sprint by increasing its presence in the mid-range business market and adding to the amount of fiber in its net ("MCI stages \$1.25b Telecom*USA buyout," *NW*, April 16). Observers said that a major reason MCI agreed to merge with Telecom*USA was to gain access to the fourth-largest carrier's in-

novative 800 services, such as calling card and voice-messaging offerings, as well as one that lets college students dial home via an 800 number.

Other second- and third-tier carriers are also regarded as marketing and technology innovators, which raises their attractiveness as acquisition targets.

Cable & Wireless Communications, Inc., for example, is recognized by analysts as being the first carrier to offer fractional T-1 services, which forced other carriers — including AT&T, MCI and US Sprint — to follow suit.

Some industry observers worry that an even stronger grip on

“Further consolidation could slow creativity in the industry,” Wilkens said.

▲▲▲

the long-haul market by AT&T, MCI and US Sprint, which already own more than 80% of the market, will stunt such innovation.

"The creativity in this industry comes not from the first-tier carriers, but from the second- and third-tier companies," WTG's Wilkens said. "Further consolidation could slow creativity in the industry."

Wilkens said he is concerned that the Federal Communications Commission's consideration about dropping AT&T's dominant carrier status has weakened shareholder confidence in the lower tier carriers, sending stock prices reeling and making the (continued on page 10)

Controversial report says U.S. lagging in ISDN dev't

ICA claims study is based on incorrect data.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — A report released earlier this month contends that by the turn of the century, the U.S. will lag far behind other countries in the percentage of lines supporting Integrated Services Digital Networks.

The report, titled "A Comparative Assessment of National Public Telecommunications Infrastructures," asserts that by 2000, only 25% of regional Bell holding companies will have ISDN lines available, while many other countries will offer full ISDN support nationwide.

"Those who believe that the U.S. public network is the most advanced in the world — and will remain so — have not considered all the facts," said William Davidson, a professor at the University of Southern California in Los Angeles who authored the report.

Davidson's report, however, is coming under fire from the International Communications Association (ICA), one of the industry's leading user organizations, which contends that the report errs in painting an accurate representation of ISDN growth in the U.S. vs. other countries.

The ICA criticized Davidson's figures, saying the report repeats mistakes he made in earlier data he compiled as a consultant to the RBHCs.

Brian Moir, ICA legal counsel, said the figures in the new report still include customer premises equipment in the analysis of network investment, data which he

said should not be included. "All the errors that existed in his earlier work are here in more depth," Moir said. He said the new report validates the ICA's earlier claims that Davidson's data is incorrect.

Davidson's report said that in 1989, Singapore became the first nation to provide universal national access to ISDN for phone subscribers. It maintained that France, Japan and the U.K. will all support ISDN on a nationwide basis by 1994. "By contrast, ISDN was available in less than 2% of central offices in the U.S. in 1989, and current projections bring that to no more than 25% in 1994," the report stated.

The report compares the actual and forecasted percentages of ISDN lines supported in various countries. However, instead of making a similar comparison for the U.S., the report contrasts the percentage of U.S. central offices that support ISDN to the percentage of lines equipped to support ISDN in other countries.

Davidson said he had to focus on the percentage of central offices rather than the percentage of lines that support ISDN in the U.S. because that was the only format in which the RBHCs would supply the data to him.

Regardless, he said, the data shows that the U.S. has fallen behind other countries in the deployment of ISDN.

"Other nations are aggressively pursuing programs of public network modernization. We are not," the report states.

(continued on page 10)

INDUSTRY BRIEFS

William McGowan, chairman and chief executive officer of **MCI Communications Corp.**, last week was released from the Presbyterian-University Hospital of Pittsburgh after undergoing exploratory chest surgery. The operation was "successful and satisfactory," said Dr. Bartley Griffith, who performed the surgery. The operation was unrelated to McGowan's heart transplant surgery in April 1987. It is not yet clear when McGowan will return to work, a company spokesman said.

IBM last week reported a better than expected 9.2% increase in earnings for the first quarter, ended March 31. Earnings rose to \$1.04 billion, compared with \$950 million for the first quarter last year. Revenue grew 11%, to \$14.19 billion, for the first quarter, compared with \$12.73 billion in the first quarter of 1989. IBM's after-tax profit margin slipped from 7.5% for the first quarter last year to about 7.3% for this year's first quarter. The overall improved results reflected "good demand across the company's product line," according to an IBM spokesman. IBM does not break out results for individual product segments, such as network products, he said. ■

Deal may ravage small carriers

continued from page 9
smaller carriers attractive takeover targets.

Not coincidentally, AT&T has been "taking a low-key approach to this event," said Mark Lowenstein, telecommunications analyst at The Yankee Group, a Boston-based market research firm.

A bigger MCI could "help AT&T's argument [before the FCC] that it is no longer a dominant carrier," he said.

Others said the MCI/Telecom*USA merger could benefit smaller long-haul carriers.

"There will be one less strong carrier in that ball game," said Paul Avakian, director of Insight Resources, a Woburn, Mass.-based market research firm. "It

frees up [market] share for other regional carriers."

One interesting situation that has yet to be resolved is how the merger will affect Telecom*USA's status as a member of the National Telecommunications Network (NTN), a partnership of six long-haul carriers that share one another's facilities to provide more cost-effective national service.

According to Martin McDermott, vice-president of NTN, the MCI/Telecom*USA merger will probably not be felt by NTN for several years, no matter what the carriers decide to do. All NTN members have agreed to continue transporting traffic for an unspecified number of years in the event of their decision to leave the partnership, he said.

WTG's Wilkens said that while

the merger is good news for Telecom*USA, it does not bode well for its peers in the second and third tiers. NTN members have developed a partnership that "when times get tough" could have been transformed into a fourth national carrier to compete with the Big Three, but the MCI/Telecom*USA merger makes such a scheme unlikely, he said. **□**

Report says U.S. lagging in ISDN

continued from page 9

His report claims that the Japanese Ministry of Posts and Telecommunications "explicitly views ISDN service as the new platform for a national 'information communications infrastructure' that is vital to national, economic and social objectives. Aggressive deployment of ISDN facilities and services represents the central objective of telecommunications policy in Japan."

Although the report does not theorize about why the U.S. supposedly trails other countries in ISDN, Davidson told *Network World* in a separate interview that "it may have to do with infrastructure investments."

Davidson, who has worked as a consultant for the RBHCs in the past, has argued that changes in both public policy and rate-of-return and depreciation rates for the RBHCs will spur introduction of these services.

But communications industry watchers emphasized that there may be other reasons for slow deployment of ISDN in the U.S. In its own comments submitted to the National Telecommunications and Information Administration (NTIA), MCI Communications Corp. stated that the delay of ISDN can be traced to disputes over standards development.

MCI suggested that ISDN had been delayed "due to the efforts of the local exchange carriers to establish standards that would make it impossible for the inter-exchange industry to provide many enhanced services that are potentially competitive."

Page Montgomery, an analyst with Boston-based research firm Economics and Technology, Inc., named standards and marketing factors as possible culprits. "There may be a market reason or a standards reason. You could conclude that's the problem — not the state of the network — that's causing the retardation in ISDN [availability]."

But Davidson dismissed those arguments. "We're insensitive about what's going on outside our borders," he said. "We seem to be apathetic about those trends. I'm concerned about national competitiveness."

Davidson stressed that the cost for his new study, which he submitted to the NTIA, came out of his own pocket and not from the RBHCs. **□**

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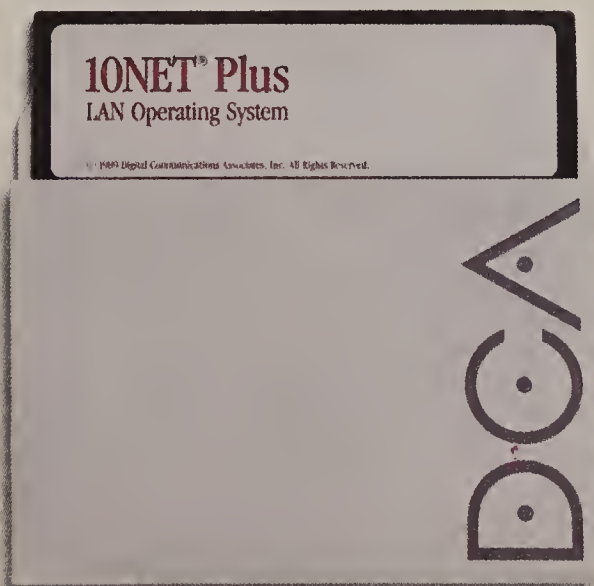
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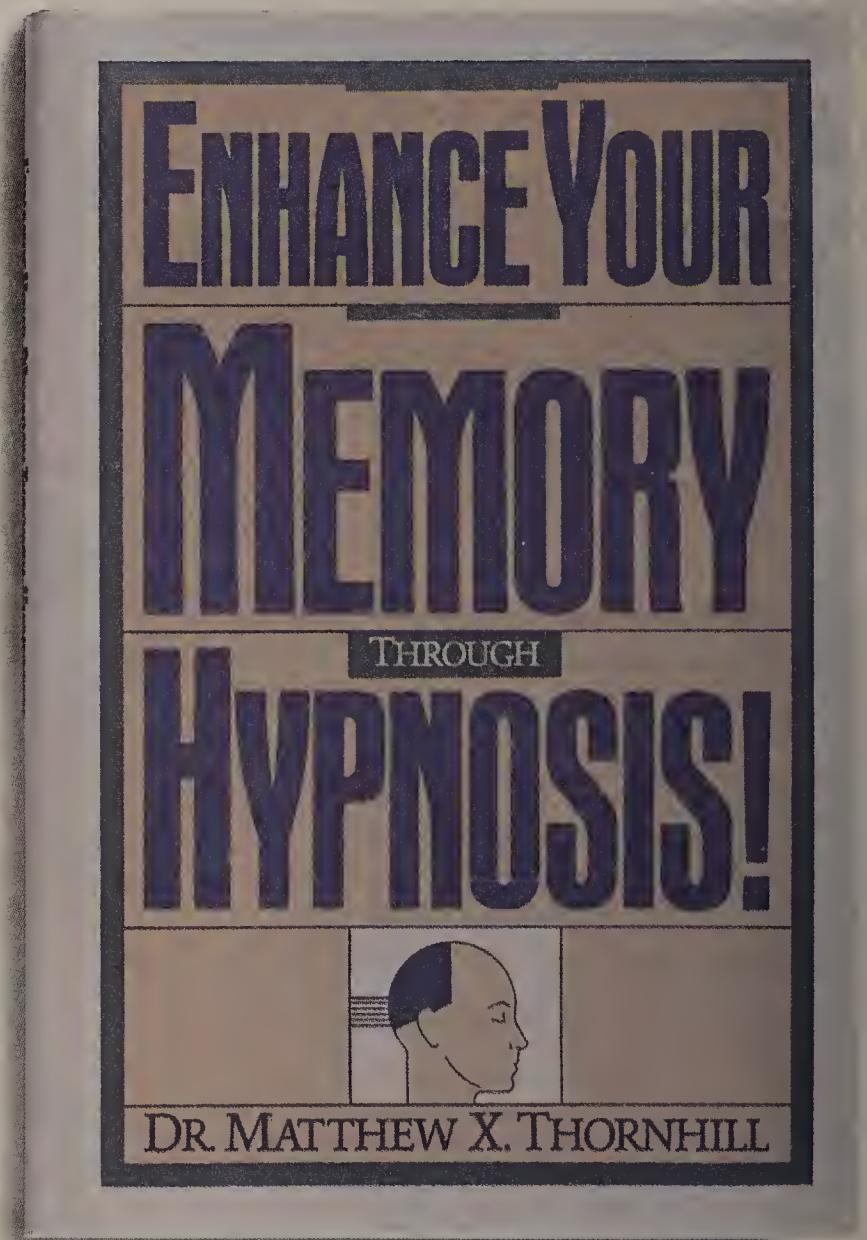
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Worth Noting

New England Telephone and Telegraph Co. has now installed 175,000 route miles of fiber-optic cable in its six-state region. The fiber helps carry more than 4.6 million calls a day.

Carrier Watch

Pacific Bell recently began offering users Custom 800, a toll-free calling service that uses regular business lines and can be made available to customers statewide or in a single town.

Statewide coverage will be provided in tandem with a user-selected long-distance carrier.

Custom 800 enables businesses of all sizes to tailor an 800 number arrangement to meet their specific needs that costs 20% to 60% less than existing 800 services, according to Gail Nugent, Custom 800 product manager.

With Custom 800, users can route calls to different locations based on time of day, day of the week, call origin and other factors. The service also enables businesses to establish contingency routing in case a disaster makes it impossible to complete calls to the user's main site.

Pacific Bell is waiving the Custom 800 connection charge for users that install the service before June 13. After that date, users will pay \$50 per 800 number to install the service on regular business lines and \$70 per line if they want a dedicated 800 line.

Weekday usage charges range from \$9 to \$11 per hour, depending on volume. In comparison, weekday rates for the carrier's other toll-free services range from \$12.50 to \$21.50 per hour, plus call set-up charges.

Custom 800 users will pay \$15 per number on regular business lines or \$20 per dedicated line. Users must pay extra for call data, handling and destination reports, according to Pacific Bell. **■**

FCC fills in details of plan to reduce AT&T regulation

Says current structure may be harmful to users.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The Federal Communications Commission recently published the full text of its March decision in which it proposed to significantly lessen regulation of AT&T.

The 75-page order gives a detailed explanation of how and why the FCC wants to give AT&T more flexibility to market services. When first announced, the FCC only released an outline of the changes.

The proposed changes would allow AT&T to offer custom and discounted network deals, such as those currently negotiated under its Tariffs 12, 15 and 16, through private contracts or as nontariffed arrangements.

The commission is also suggesting that the tariffing procedure for AT&T's other business services, such as Software-Defined Network, Megacom and private lines, be significantly streamlined.

Experts on both sides of the issue will now have a chance to voice their opinions about the proposal. Parties have until June 12 to file comments.

In the order, the FCC said it is concerned that the current regulatory structure may be harmful to users. "Instead of protecting the public, our tariffing require-

ments may unnecessarily be denying or delaying the consumer benefits of rate decreases and new service offerings," the order stated.

Based on publicly available information, the FCC has concluded that the long-distance industry has become sufficiently competitive "to allow a gradual lifting of many of the constraints" on AT&T. "It makes little sense to withhold from AT&T the basic weapon its competitors have to wage their competitive battles: the ability to lower prices quickly to meet or beat the competition," the FCC said.

The idea that the long-distance market is competitive, however, is likely to be hotly contested. Rival carriers point out that AT&T's share of the total interstate market is between 66% and 69% and is higher for some individual services such as 800 and international. In past discussions, opponents have questioned how the restrictions on AT&T could be lifted when the carrier has such a large share of the market.

The FCC does not dispute that AT&T retains substantial market share in most service areas. It acknowledges that AT&T's share of the overall interstate market is between 65% and 70%, depend-

(continued on page 16)

WASHINGTON UPDATE

BY ANITA TAFF

RBHCs wait to celebrate. A report issued last week said it may be too early for the regional Bell holding companies to claim victory concerning the U.S. Court of Appeals decision to have U.S. District Court Judge Harold Greene reconsider his ruling prolonging the ban on RBHC information services.

The report from the Washington Analysis Corp. said it is unclear that the RBHCs will win any market freedoms as a result of the appeals court ruling. The firm points out that it is "quite possible the judge will reach the same conclusion" upon reconsideration. Even if Greene alters his previous decision, Washington Analysis predicts it may not occur until 1992 and Greene would still be likely to subject the RBHCs to a broad array of conditions. The report said that special provisions might be included to prevent newspaper classified advertising revenue from being siphoned off by electronic yellow pages.

The fate of a separate but related effort of the RBHCs to enter the cable television business also rests on Greene's decision. Currently, the information services restrictions prevent the RBHCs from purchasing cable TV operations outside their telephone serving areas. Pacific Telesis Group currently has a petition pending before the Department of Justice asking for a waiver so that it can buy a cable firm.

Whatever decision Greene reaches, the report said it is likely to be appealed and the process should take about two years. **■**

Description	Installation charge	Pricing alternatives	
		Monthly lease	Purchase
AT&T 6386 WorkGroup System 80M-byte hard disk 1M-byte RAM 3.5 in. floppy disk	\$50	\$447.37	\$5,295
329 VGA color monitor	25	63.28	749
VDC600 VGA video board	30	50.61	599
4M-byte memory upgrade kit	75	189.85	2,247
Unix Release 3.2	245	67.17	795
2296 9.6K bit/sec modem	140	210.80	2,495
570 printer	50	58.72	695
RCS-PCI software	135	—	500
Total expenditure	750	1087.81	13,375*

*Plus \$60/month for maintenance and upgrade.

VGA = Video graphics adapter

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: AT&T, BASKING RIDGE, N.J.

AT&T tool controls 800, 900 networks

Workstation enables users to reconfigure service options off-line, generate a number of reports.

By Bob Wallace
Senior Editor

BOSTON — AT&T recently introduced the Accumaster Services Workstation, an AT&T 6386 WorkGroup System microcomputer and software that enables users of its Routing Control Service to more flexibly manage multiple 800 and 900 numbers.

The Accumaster Services Workstation, also known as Routing Control Service Personal Computer Interface (RCS-PCI), was demonstrated for the first time for 700 customers at AT&T's recent Inbound Services Management Group meeting here.

The workstation was codeveloped by AT&T and members of the Inbound Services Management Group's Continuing Development Committee, a select group of large 800 users.

The workstation, which can be purchased or leased (see chart), offers more capabilities than the ASCII RCS terminal that customers currently use to manage toll-free numbers, but AT&T will continue to sell and support the RCS tube.

"We have taken the intelligence that resided in the network and extended it to the workstation on the customer's premises," said Pete Webster, 800 services product marketing manager for AT&T.

The workstation was designed for 800 customers that need to frequently change routing arrangements to react to fluctuating call volumes, special promotions, natural disasters, cable cuts and customer premises equipment failures.

With the workstation, users can establish a dial-up line to an AT&T network mainframe, download their 800 routing configuration data and manipulate it off-line.

After the changes are made, the computer runs the configuration through a validation process to see if the changes are feasible, making sure, for example, that the user hasn't allocated more than 100% of his traffic among sites. This process takes three to five minutes.

Customers then upload the configuration to the mainframe

“We’ve taken the intelligence that resided in the net and extended it to the workstation.”

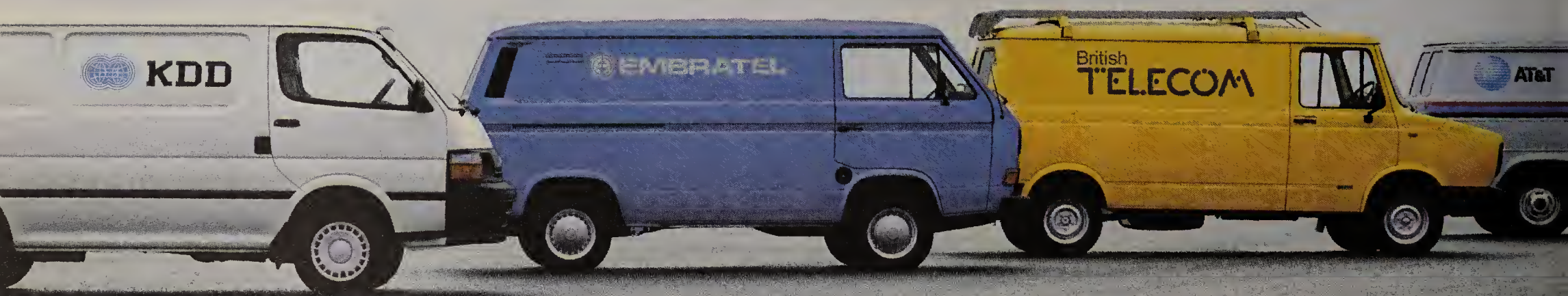
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and wait for a second validation, which takes another five to 10 minutes. Once approved, the configuration is passed to network control point data bases throughout the network.

By comparison, customers using the older ASCII terminals cannot download configuration data, meaning all work has to be done on-line and the user has to foot the bill for connect time. AT&T supports RCS terminals at 2,400 bit/sec and the new workstation at 9.6K bit/sec.

(continued on page 16)

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Routing system for toll-free 800 service lets agents work at home

Patented system just now coming to market will help large telemarketing organizations deal with bursts of traffic better.

By Joe Panepinto
Staff Writer

PASADENA, Calif. — An affiliate of the Worldwide Church of God has patented and will soon begin marketing a call-forwarding system developed for the church that transparently routes incoming 800 calls to agents working at home.

Engineers at Ambassador College, based here, developed the Supervised Worldwide Intelligent Forwarding Network (SWIFNET) four years ago to handle calls generated by *The World Tomorrow*, a television show produced by the church and aired on nearly 300 television stations.

Ambassador College recently received its second patent on the software used to drive the system and is gearing up to market the system commercially.

"We're trying to patent the whole concept of how we deal with agents at home," said Oleh Zajac, licensing coordinator of the SWIFNET development team at Ambassador College. "We want to try to protect the look and feel of our product."

Zajac says SWIFNET has been used since

enables the church to add agents to field calls as traffic demands.

SWIFNET consists of a rack with 150 line cards in Pasadena that marry inbound 800 lines to outbound Centrex lines terminating at a local Pacific Bell central office. The rack is connected directly to an IBM Personal Computer AT clone, which in turn is linked via dial-up lines to a remote supervisor's computer that can be located

anywhere in the U.S.

When the show begins in any given time zone, the supervisor dials up the controlling personal computer and downloads the names and telephone numbers of at-home volunteers in that time zone. The controlling computer then dials the agents on the list.

Connection made

Once the Centrex link is established with the home-based agents, they are kept on-line for as long as there is sufficient traffic to keep them busy. Inbound 800 calls are automatically routed to the waiting agents in a predetermined order without ever breaking the circuit.

Operators on-line can contact the supervisor, signal an emergency, put a caller

on hold and answer or reject calls by using different numbers on a standard telephone keypad.

In addition, SWIFNET lets supervisors monitor calls via a color display and enables them to be patched through to any line by the controlling computer.

"Another benefit to us is that since we operate in all six U.S. time zones, we are able to electronically move our calls to agents in all six time zones, including Alaska and Hawaii, depending on when the show is aired," said Bill Butler, call center manager at Ambassador College.

"We can also handle emergency peak periods," he said. "If we get a totally unexpected nasty influx of calls, we can bring agents on-line in literally a matter of seconds." ■

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The system can help users with heavy, sporadic or short-lived peak traffic periods slash telecommunications overhead.



1986 to route more than two million telephone calls to thousands of church volunteers around the country who are working at home.

He claims the system can help users with heavy, sporadic or short-lived peak traffic periods slash telecommunications overhead.

According to Ian Angus, president of Angus TeleManagement Group, Inc., a consultancy in Toronto, anyone who uses mass media to stimulate calling by broadcasting an 800 number will find the technology useful.

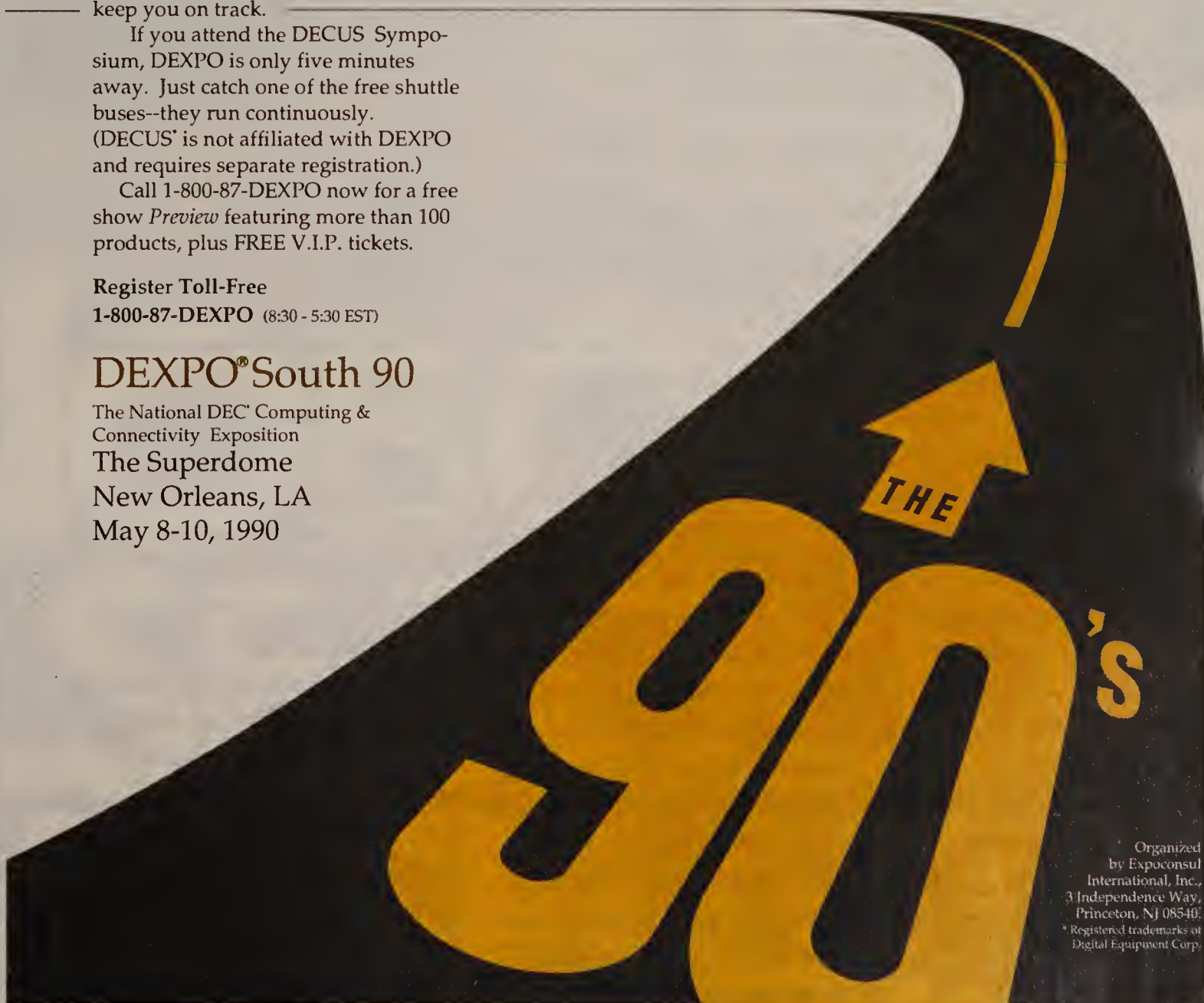
"The amazing thing is that this was not developed by anyone in the telecommunications industry," Angus said. "This is a user-developed technology."

Dispersing calls

SWIFNET allows users to handle intense bursts of telephone traffic without the expense of equipping calling centers for peak loads.

The church, for example, was airing its toll-free 800 number twice during its half-hour show, once for 90 seconds near the beginning of the show and a second time for five minutes at the end.

Although the church operates call centers in Pasadena and Big Sandy, Texas, agents at the centers were overwhelmed by the volume of calls that came in following the broadcast of the number. Callers were forced to wait up to 10 minutes for their call to be answered, Zajac said. SWIFNET



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AT&T tool controls 800, 900 networks

continued from page 13

The terminal enables users to activate, modify or deactivate announcements and any 800 service feature, including 800 area code routing, 800 exchange routing and 800 command routing.

However, the terminal forces users to administer one 800 number at a time, meaning they have to log off and log back on to update a second number. "This was a terrible burden for telemarketers and large companies with scores of 800 numbers," AT&T's Webster said.

The Accumaster Services Workstation enables users to make multiple changes during a single session. It also allows users

to administer MultiQuest 900 numbers and 800 numbers, according to Dick Stieglitz, RCS product management manager. Large corporations use MultiQuest for information dissemination applications.

Report options

Beginning in the fourth quarter, AT&T will enable customers to use Accumaster Service Workstations to request a variety of reports and data about Megacom 800 calling patterns. The options, part of AT&T's Customer Traffic Data Reports, contain two types of data — the total number of calls for the specified period and the number of calls overflowed to other lines.

With Quick-Call Attempt Profiles, users receive a list of call attempts by area code of origin and time of day. This data is sent

to the workstation within 48 hours of the on-line request.

Quick Call Allocator will enable users to change the percentage of 800 calls split between multiple locations 50% faster than could be done with the asynchronous terminal, according to Webster.

"With the old terminal, when a user made even a small change to his 800 number routing plan, our computer had to revalidate the entire [800 routing tree]. Now, only the part that was changed is revalidated," Webster explained.

Customers can use Quick Call Allocator to reroute calls away from a downed or swamped site. For example, a company with call centers in Chicago, Los Angeles and New York that loses its New York site can activate a preset backup routing plan

that instructs the AT&T network to split the New York traffic between the other two locations.

Customers can also submit "pending" routing plans, which are validated, stored and implemented at a prespecified date.

Online Detail Reports list the time each call arrived, the duration of the call and the number of the caller; this information is delivered within 72 hours. These reports are currently only available on paper or magnetic tape, Webster noted.

Inbound Test Call enables users to verify that changes to their 800 routing plan have been implemented by having them dial a test 800 number and check to see if the call is routed to the correct site, Webster said.

AT&T will announce the next release of Accumaster Workstation software, Release 2.0, in October. The software will run on Sun Microsystems, Inc.'s SPARCstation and use AT&T's Open Look Graphical User Interface, a Unix-based software graphics package.

Release 2.0 will support additional features, including trouble reporting, data collection, alarms and order entry, according to Stieglitz.

AT&T will hold three-day Accumaster Services Workstation training courses beginning next month in Kansas City, Mo., and Cincinnati, Stieglitz said. Attendees will be given hands-on training with the system and will be able to build 800-number routing trees. ■



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FCC details for reducing regulation

continued from page 13

ing on the criteria used. It also said that AT&T retains about 80% of all interstate 800 traffic and 90% of international calls.

However, the FCC concluded that an analysis based solely on market share "would be too static and one-dimensional." Instead, the FCC said it based its view of AT&T's fading dominance on a number of factors, such as ease of entry for new carriers, financial health of current carriers, and the power and sophistication of telecommunications users.

The agency said its analysis relied heavily on the amount of facilities currently installed by rival providers and their ability to meet additional user demand.

US Sprint Communications Co. and MCI Communications Corp., AT&T's two largest rivals, have facilities in every state, with US Sprint serving every local access and transport area in the country.

This substantial unused transmission capacity puts AT&T's rivals in a good position to capture large numbers of customers quickly at a low cost if AT&T raises its prices in an anticompetitive fashion, the FCC concluded. Any efforts by AT&T to underprice services and drive competitors out of the market would probably backfire.

"We do not believe that AT&T could expect to recoup the losses from sustained below-cost pricing, even if it thought that it could eventually drive its existing competitors from the market," the FCC order stated. Even if it succeeded in such a mission, new companies would probably purchase the network assets of the failed companies and become new competitors.

The FCC also expressed confidence that it would be able to detect predatory pricing on the part of AT&T and put a stop to it. Such behavior would violate U.S. antitrust laws, and rival carriers could sue for substantial damages, the commission said. ■

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

“We may be on the high end of the curve with a high-priced product, but [the curve] is going to catch up to us very quickly.”

Rick Roberts
Staff manager
Net management systems
AT&T
Speaking about AT&T's
Accumaster Integrator
Anaheim, Calif.

Data Packets

IBM recently announced that its IBM Information Network (IIN) will support links to IBM Application System/400, System/36 and System/38 minicomputers.

Users can employ IIN as a backbone network to link numerous minicomputer sites without having to manage the backbone facilities. Included is support for IBM's Advanced Program-to-Program Communications and Advanced Peer-to-Peer Networking.

In addition, the new service lets minicomputer users access the various services IIN provides, such as electronic mail, electronic data interchange and access to commercial data bases.

Hewlett-Packard Co. last week announced that the CAD Framework Initiative (CFI) will use HP's Network Computing System (NCS), a distributed application development tool, to link five vendors' Unix workstations in a demonstration at the Design Automation Conference in Orlando, Fla., this June.

CFI is a standards body comprising more than 40 computer-aided engineering software vendors, users and workstation vendors. The group plans to demonstrate a procedural interface that shows the integration of at least 20 CAE applications running on Unix-based workstations from the Apollo Division of HP, Digital Equipment
(continued on page 22)

Prudential automates net control

By Paul Desmond
Senior Writer

ANAHEIM, Calif. — The Prudential Insurance Co. of America has automated corrective responses for more than 70% of the routine network management messages its Systems Network Architecture network produces, freeing network operators to handle more important alerts.

A user of System Center, Inc.'s Net/Master since 1987, Prudential has succeeded in using the product to write programs that automatically correct the mundane, repetitious alarm and alert conditions generated by its large network, said George Sadlock, director of teleprocessing for the insurance giant. Sadlock outlined his company's network management strategy for attendees at the recent Network Management Solutions '90 show here.

Prudential uses a three-pronged approach to achieving

automated operations, he said. First, it uses Net/Master to integrate and correlate alarms coming from a variety of sources. Then it identifies the alarms to which responses should be automated and, lastly, it uses Net/Master's fourth-generation Network Control Language to develop those responses.

The strategy is producing impressive results. Physical unit-to-logical unit availability is at 98% and response time is less than two seconds for 87% of all transactions; it is less than four seconds 96% of the time.

Additionally, 70% to 90% of all alert messages have been suppressed, which means the messages are handled automatically without operator intervention.

Such automation is important for a network the size of Prudential's. In four service centers, the company houses a total of 23 IBM 3090 or compatible mainframes that support 83 front-end processors — 30 local and the rest remote — plus 40,000 IBM 3270-type terminals, 13,000 personal computers and 9,000 laptops. The four service centers support more than 2,000 other locations.

Prudential also uses more
(continued on page 20)

EDI helps company streamline billing

Lex Service links bill collection data at banks with its internal accounts receivable application.

By Jim Brown
Senior Editor

STAMFORD, Conn. — Electronics supplier Lex Service, Inc. recently enhanced its electronic data interchange network to support transmission of bill collection data from two banks to its IBM mainframe-based accounts receivable application.

The process reduces the time it takes Lex Service to handle its daily accounts receivable processing chores by 2½ hours and enables the company to credit customer accounts faster in order to extend credit lines for new orders.

Previously, Lex Service customers had to wait several days after making a payment before they could place another order or had to rely on secondary vendors when the available credit was stretched to its limits.

Lex Service subscribes to an electronic lockbox service offered by Pittsburgh National Bank and Mellon Bank, N.A. in which Lex Service customers send checks to either bank to pay their bills.

The banks deposit the checks in a Lex Service account and electronically transmit an accounts receivable summary file in an ANSI X12 823 format to accounting software running on Lex Service's mainframe.

In addition to Pittsburgh National and Mellon's electronic lockbox, Lex subscribes to paper-based lockbox services offered by four other banks across the country. Those four banks mail paper-based accounts receivable summaries to Lex.

Technically superior

“None of our other banks are anywhere near as [technically] sophisticated as Pittsburgh National or Mellon,” said Doug Freedman, Lex Service's treasurer. In addition to their technical prowess, Pittsburgh National and Mellon combine to process nearly 80% of Lex Service's checks. “So there was a strong cost-justification to get those two on-line to our mainframe.”

With Pittsburgh National's electronic lockbox service, incoming checks are fed into a check reader terminal that scans the account number from the magnetic ink character-recognition line encoded at the bottom of the check.

Other information, such as the

amount of the check and the invoice number the check was intended to pay, is entered into an IBM 3770 remote job entry terminal by bank clerks, said Susan Rapp, Pittsburgh National's vice-president of EDI and electronic funds transfer consulting.

Data stored on the 3770 remote job entry terminal is

The new process enables the company to credit customer accounts faster.

▲▲▲

uploaded to an IBM MVS/XA-based 3084 mainframe that runs Connexion software, which was jointly developed by Pittsburgh National and National Systems Corp. of New York. Connexion converts the data from the proprietary format used by Pittsburgh National check processing applications into the ANSI X12 823 electronic lockbox format.

That ANSI-formatted data is uploaded to a GE Information Services EDI*Express electronic mailbox over a 4.8K bit/sec dial-up link using IBM's Binary Synchronous Communications.

Mellon follows a similar approach, according to Freedman.

Homegrown software

Lex Service uses a 4.8K bit/sec dial-up link to download the data files from the GE Information Services mailbox to its IBM 3081 mainframe. Lex Service developed its own mainframe-based software that converts the ANSI X12 823 format to an IBM VSAM flat file.

A Lex Service-developed application uses that VSAM data to build a check register automatically. Lex Service accounting clerks with IBM 3278 terminals use that check register to determine which accounts receivable files to update.

Previously, Pittsburgh National and Mellon mailed ledgers explaining which bills had been paid and photocopies of checks and invoices to Lex Service. About 20 Lex Service clerks then had to enter data manually from the ledgers
(continued on page 20)

Education, medical users flock to private packet nets

By Paul Desmond
Senior Writer

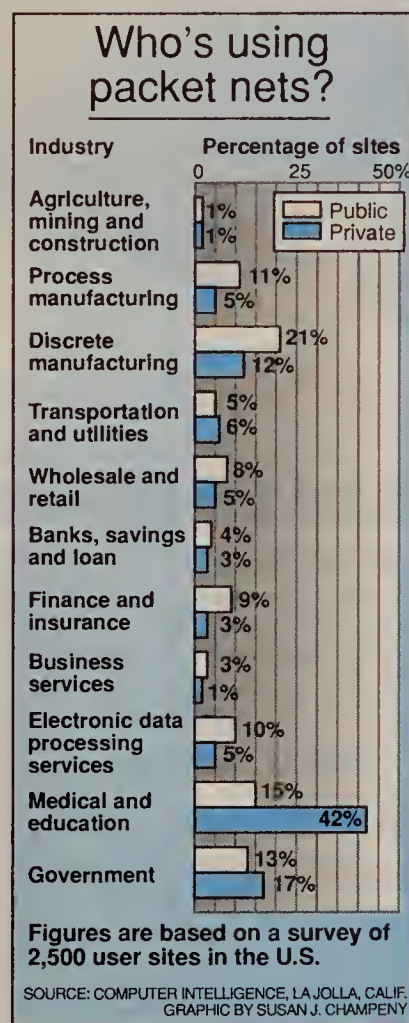
LA JOLLA, Calif. — Users in the medical and education field are by far the largest users of private packet networks, according to a report by a market research firm here.

That market accounts for 42% of all private packet network customers, 25% more than government users, the next nearest industry segment at 17%. Those figures are based on interviews with 2,500 users, said Bruce Coughran, communications industry analyst with Computer Intelligence.

Third among the largest users of private packet nets, at 12%, is the discrete manufacturing industry, which consists of manufacturers of durable goods, as opposed to process manufacturers, which make consumable or non-durable goods.

After that, no industry segment has more than a 6% market share (see graphic).

Coughran said the medical and education industry came out on top among private packet net users because users in the medical and education fields were the first to move to packet switching. The technology continues to be heavily used in universities and



for communications among research centers.

There is a much more distributed base of public packet network users, according to Comput-
(continued on page 20)

Education, medical users flock to nets

continued from page 19
er Intelligence research.

"For a commercial business, it's generally going to be easier to subscribe to a public packet network for packet-switching needs rather than establish your own packet net," Coughran said.

Public packet transportation

Discrete manufacturing sites, with 21%, form the largest segment of public packet net users, but users in five other industry segments each constitute 9% or more of that market.

Discrete manufacturers are tops in the category because "they're a large industry

segment and they're a large industrial user of computers," Coughran said.

The five runner-up industries are: medical and education (15%), government (13%), process manufacturing (11%), electronic data processing services (10%), and finance and insurance (9%).

Computer Intelligence also found a trend regarding the type of equipment used in packet-switching sites in that Digital Equipment Corp. VAX machines are either planned or installed in 47% of all private packet network sites. By contrast, IBM mainframes are planned or installed in 80% of all public packet network sites.

Coughran said the discrepancy has to do with profiles of VAX and IBM users. IBM-based networks tend to be centralized with numerous distributed sites, which

Discrete manufacturing sites, with 21%, form the largest segment of public packet net users.

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makes them more suitable for public nets. The VAX, on the other hand, is more prevalent in the medical and education industry and among technical government users. Those users are among the leading private packet network users, he said. ■

Prudential automates net control

continued from page 19

than 500 telecommunications lines ranging in speed from 4.8K bit/sec to T-1, with a total bandwidth of 100M bytes. Those facilities are supported by Timeplex, Inc. multiplexers, which feed alerts to Net/Master via NetView/PC, Sadlock said.

Writing the book on automation

To handle the alarms generated by those facilities, Prudential developed about 40 automated operations tasks. Sadlock defined automated operations tasks as programs that automate a routine task usually handled by an operator. Examples include restarting a line or restarting IBM's CICS.

In addition, Prudential has also developed and written about 100 Net/Master enhancements, which he said are single Net/Master commands that trigger other commands, similar to IBM's Command Lists for NetView.

Prudential has developed about 100 enhancements, single commands that trigger multiple other commands.

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Another feature, the Prudential Automated Availability Reporting System (PAARS), automatically generates daily reports on physical unit-to-logical unit availability statistics. PAARS can more accurately assess availability than the system it replaced, which required an operator to key in data on every outage, Sadlock said.

Looking toward the future, Prudential is now grappling with how to use Net/Master to manage local-area networks from its four central control centers and is developing a NetView/PC application that will support its Xerox Corp. printers. The NetView/PC application would eliminate the need to reexecute jobs that don't print due to a printer failure, Sadlock said. ■

EDI helps company streamline billing

continued from page 19

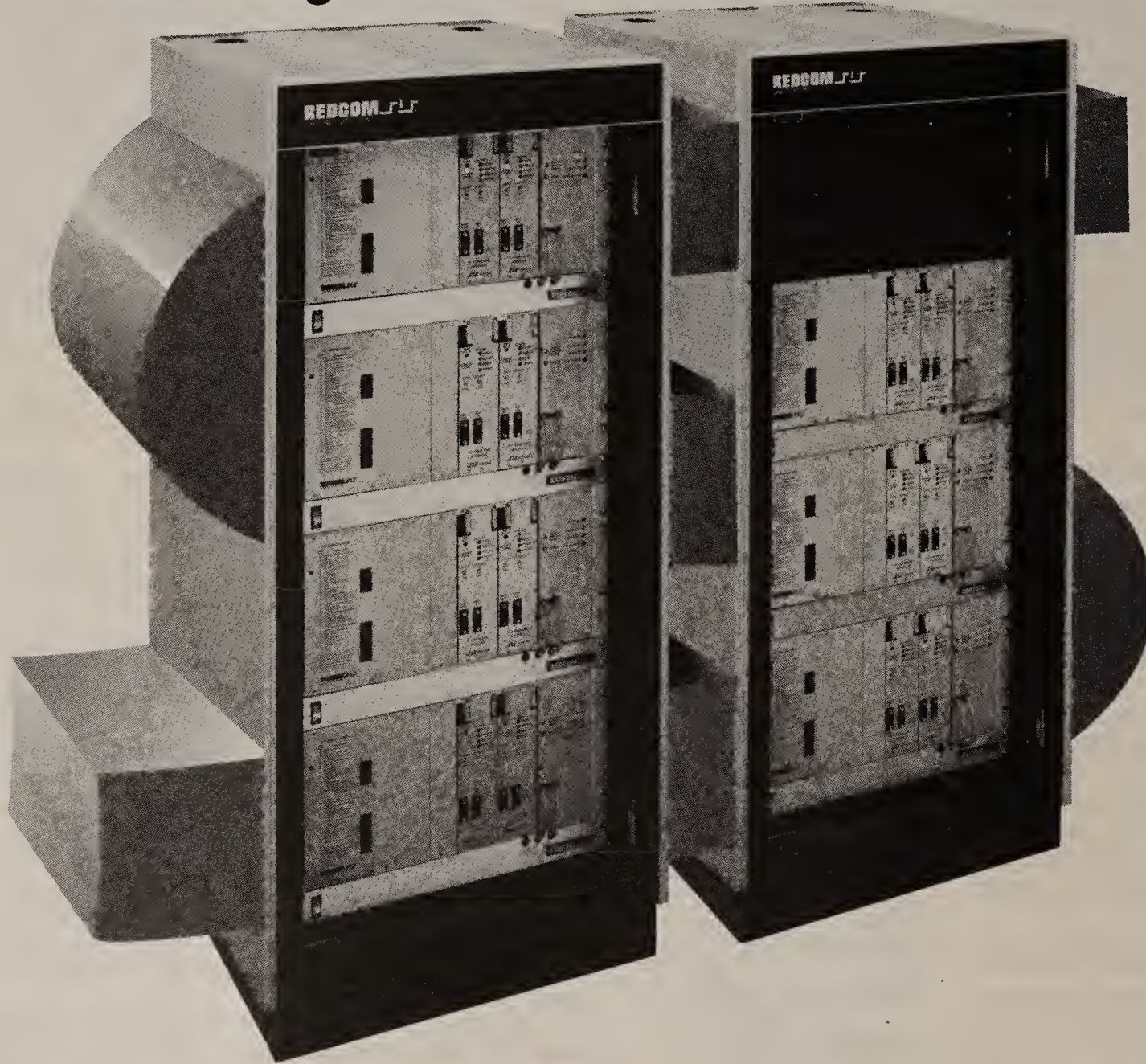
ger and the checks into its accounts receivable application to create the check register.

"Clerks would spend the first 2½ hours each morning literally taking information off the check and keying it into our own accounts receivable system," Freedman said. This accounted for about 50 man-hours of productivity each day, he added.

That time can now be used to credit customer accounts faster and to handle customer billing and credit problems better. Additionally, Lex Service will be able to reduce its staff over time by phasing out clerical jobs through attrition.

The next step for Lex Service is to write software that will automate account updates by matching bank account data with Lex Service's internal customer account code. By matching these two numbers, Freedman said, Lex Service hopes to update the accounts of half of its customers automatically. ■

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Customs backs new EDI message set that eases imports, exports

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The U.S. Customs Service said recently it will support a new electronic data interchange transaction set this fall that will greatly facilitate the document exchange process for import and export declarations.

The EDI transaction set, called Customs Declaration (CUSDEC), is based on the EDI for Administration, Commerce and Transport (EDIFACT) standard, and will enable importers and exporters to submit a

single electronic form declaring the contents of a shipment to customs officials.

Currently, the Customs Service requires companies shipping imports and exports to provide a multiform electronic manifest. CUSDEC filings will consolidate that information into a single form.

CUSDEC contains information about duties, fees, cargo, packaging and shipping methods, for instance. With just one CUSDEC message from an importer or broker, customs officials will be able to classify cargo and value, and provide the shipper

with a paperless release.

"CUSDEC will eliminate the need for other documents, such as an entry summary," said Bernadette Curry, program manager in the Commercial System Development Division of Automated Commercial Systems, the Customs Service unit that operates its networks.

Customs officials at a recent EDI seminar emphasized to the more than 150 importers and brokers attending that CUSDEC support will not be a requirement. The Customs Service will still maintain its Automated Broker Interface (ABI) EDI network, which is based on proprietary standards.

But customs officials are urging businesses to jump on the CUSDEC bandwagon because global firms will soon be cement-

ing trade relationships using EDIFACT.

The new EDIFACT-based message set, CUSDEC, has received tentative endorsement by the United Nations Working Group 4, and final approval is expected later this year. Customs officials said they hope that the importers and brokers that currently use the ABI automated entry system will recognize the importance of EDIFACT and take advantage of the convenience of the CUSDEC message set.

ICI Americas, Inc., Philips North America and Texas Instruments, Inc. already have said they will participate in Customs' first operational pilots with the CUSDEC transaction set this spring.

Most EDI users in the U.S. have been slow to embrace EDIFACT because U.S. industry, having played a leading role internationally in EDI development, has settled on use of the ANSI X12 standard or a variety of proprietary EDI formats.

Further, since only three EDIFACT message sets have been approved to date by the United Nations, many users do not see any immediate reason to convert to EDIFACT. But U.S. Customs Service officials warn that they expect a rapid expansion of EDIFACT as a trade language this year.

"You're going to see the critical mass of EDIFACT messages developing," said Sam Banks, assistant commissioner at the Customs Service, who predicted that 32 new EDIFACT message sets will be approved by the U.N.

Other customs officials point out that other countries are already moving to EDIFACT, saying that the U.K. and Ireland have announced support of EDIFACT, and the customs services of Sweden and Switzerland are building EDIFACT systems.

Canada also has been releasing cargo using the CUSDEC message set, said Vicki Hodziewicz, director of the Office of Trade Initiatives at U.S. Customs. Norway is already using EDIFACT for its import system, she said. **■**

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ENTERPRISE INTERNETWORKING

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Data Packets

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Corp., HP, IBM and Sun Microsystems, Inc. The applications will use NCS to share data and design information.

Tekelec, Inc. last week announced new DS3 and digital data service (DDS) testing options for its Chameleon 8000 digital transmission test system.

The new DS3 Module tests the 44.768M bit/sec signals that carry 28 T-1 lines (T-3), while the DDS Module tests DDS point-to-point and multipoint digital transmission services.

The DDS Module and DS3 Module are expected to ship next month. The DS3 Module ranges in price from \$3,700 to \$5,350, depending on the applications selected. The price of the DDS Module ranges from \$1,200 to \$2,000 and requires the Data Bit Error Rate Test (BERT) Module, which costs \$1,800.

Zurich-based **Swissair** is expanding its international voice and data network in North America and Europe with the addition of European T-1 (E-1), fractional E-1 and fractional T-1 links to cities in seven countries. The links will be supported by \$1.5 million worth of Timeplex, Inc. multiplexers.

The network will carry voice traffic plus data on cargo reservations, fares, tariffs, accounting and administrative information. **■**

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Worth Noting

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Michael Clair
Vice-president of
sales and marketing
SynOptics Communications Corp.
Mountain View, Calif.

Netnotes

Tri-Data Systems, Inc. recently announced a family of local-area network routers capable of routing AppleTalk data across a mixed environment of multiple LocalTalk, token-ring and Ethernet LANs.

In its base configuration, the MaxWay 500 comes with four LocalTalk ports plus either an Ethernet or token-ring connection. It also has an expansion slot that supports another Ethernet or token-ring interface. All three LAN types can be attached to a single MaxWay 500.

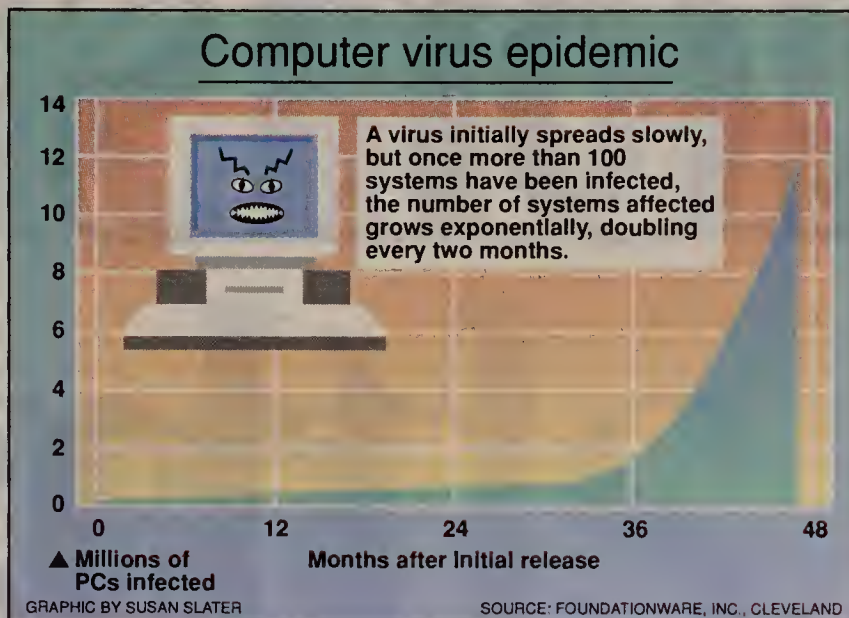
The router is based on a 10-million instructions per second version of Sun Microsystems, Inc.'s SPARC Reduced Instruction Set Computer chip and uses the VMEbus to allow high-speed network throughput.

There are two token-ring versions: one that operates at 4M bit/sec and one that supports both 4M and 16M bit/sec operation.

Each MaxWay 500 unit is priced at \$7,495, and the optional expansion adapters costs \$2,795 each.

The Ethernet and 4M bit/sec token-ring routers and adapters are slated to be available next month, and the variable-speed 16/4 MaxWay 500 token-ring router and adapter are scheduled for release in June.

For more information, contact Tri-Data Systems at 3270 Scott Blvd., Santa Clara, Calif. 95054, or call (408) 727-3270. ■



Virus threat obscured by slow growth in early stages

Some bugs only hit their stride after three years.

By Laura DiDio
Senior Editor

CLEVELAND — A computer security expert last week said that tens of millions of personal computers could fall prey to computer viruses by 1992.

“We’re looking at an epidemic,” said Peter Tippet, founder and president of FoundationWare, Inc., a manufacturer of systems management software. He also authored a paper called “The Kinetics of Computer Virus Replication.” According to Tippet, “Within two years, computer viruses will directly affect at least eight million — and probably many more — PCs.”

“Replication is an inexorable process,” he said. “Any networked computer that is infected with a virus will continually try, until it is successful, to infect other computers.” Even stand-alone microcomputers are vulnerable to infection through bulletin board programs or infected floppy disks, which are often passed from user to user.

“After the first infection, it can take the average computer virus a long time to infect a great numbers of systems,” Tippet said. “But once they get going, they experience exponential growth, and then, before you know it, you’ve got a plague of epidemic proportions.”

History of Friday the 13th

In 1988, the year that the Friday the 13th virus appeared, Tippet estimated that it may have infected fewer than 100 computers. By the end of the second year, according to Tippet’s projections, the ranks of infected systems had swelled to 5,000.

In this, its third year of existence, the Friday the 13th virus — which is triggered by the date and gobbles up system memory by replicating itself — can be ex-

pected to infect 25,000 microcomputers. However, by 1992, when the virus celebrates its fourth birthday, Tippet predicts that at least eight million computers will have caught this particular bug.

The prediction is even more grim when users consider that this is the projected rate of infection for just one virus.

“There are probably more than 100 distinct MS-DOS viruses making the rounds now, so you can see that the computer and network user community is faced with a problem of enormous proportions,” Tippet said.

Although local-area networks have preventive measures to protect file servers, current network security isn’t designed to address computer viruses. Network security is geared towards user privacy — that is, denying one person access to another person’s network data.

“Even if a network administrator installs the best currently available security packages, it won’t really offer an adequate defense against common computer viruses,” Tippet said.

Currently, the most effective tactic to ward off potential viruses is to put server-based software programs into execute-only mode. This means users can run the program, but the program will be immune to attempts to alter the application.

“It’s also a good idea for network administrators to put entire directories into execute-only mode, thus obviating the possibility that the virus can use the file server as a vehicle to spread the virus,” Tippet added.

For a free copy of “The Kinetics of Computer Virus Replication,” write to FoundationWare at 13110 Shaker Square, Cleveland, Ohio 44120, or call (216) 752-8181. ■

Hospital net links Novell, DG systems

Fiber Ethernet backbone to support patient care, laboratory and administrative environments.

By Laura DiDio
Senior Editor

PROVIDENCE, R.I. — Women and Infants Hospital, one of the largest neonatal care centers in the Northeast, is installing its first local- and wide-area networks in an effort to speed up admissions and reduce the time it takes to get test results from labs.

The nets will replace the practice of manually recording admissions, laboratory results and fiscal records. They are expected to save the hospital \$200,000 per year in operational expenses, according to Bruce Reirden, vice-president of data processing.

Women and Infants Hospital delivers 62% of all the babies born in Rhode Island and many from neighboring Massachusetts and Connecticut. It has won nationwide acclaim for its pioneering obstetrics, gynecological and prenatal care treatment, but its data communications efforts have lagged behind the times.

Until recently, the hospital used low-end Data General Corp. minicomputers at its remote data processing center to support ac-

counting applications accessed via dumb terminals.

“We were suffering from informational and network neglect,” Reirden said. “By installing LANs and linking our CRT terminals to the DG minis via terminal servers, we’re bringing information to our users stat, enabling them to access all types of information from any point in the hospital almost instantaneously.”

The Women and Infants Hospital net now being installed by DG, the systems integrator on the project, includes a 10M bit/sec Ethernet fiber-optic backbone supporting three Novell, Inc. NetWare Ethernet subnetworks. The subnets support a total of 40 IBM Personal Computers and Apple Computer, Inc. Macintoshes.

The hospital has another 100 stand-alone personal computers, 130 dumb terminals, 25 printers and approximately 10 lab instruments that will be linked to the Ethernet backbone.

The three NetWare LANs are linked to the backbone via DG’s
(continued on page 26)

AppleTalk/E-net gateway gets better WAN support

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — At the recent MacWorld Exposition 1990 here, Cayman Systems, Inc. introduced software enhancements that improve the wide-area networking capabilities of its GatorBox AppleTalk-to-Ethernet gateway.

With Release 1.5 of the GatorBox system software, the gateway can be used to connect remote Apple Computer, Inc. AppleTalk local-area networks to one another via Transmission Control Protocol/Internet Protocol. Previously, GatorBox gateways could only communicate over a TCP/IP backbone using Ethernet protocols.

Other new features include AppleTalk Phase 2 support, Simple Network Management Protocol (SNMP) support, improved security via selective filtering, and compatibility with Novell, Inc.’s FastPath gateway.

“Network managers at customer sites told us they need to

manage large AppleTalk networks more efficiently,” said Ted Stabler, president of Cayman. “We designed the features in [Release] 1.5 so they could.”

Atalkad

One customer requirement was the ability to mix GatorBoxes in with the widely installed FastPath gateways without adding to network management complexities. Cayman met this need by building into the GatorBox support of “Atalkad,” the AppleTalk administrative process developed for managing FastPaths.

Ultimately, Atalkad will be replaced by SNMP. According to Stabler, Cayman and Novell have worked together to develop a standard AppleTalk Management Information Base for SNMP.

Eventually, this SNMP extension should enable third-party SNMP management stations to monitor AppleTalk devices on the far side of a GatorBox or FastPath gateway.

(continued on page 26)

Actions speak louder than words

Virtual Network Features	AT&T SDN	MCI® Vnet SM
Dedicated virtual network Control Center with specific technicians who can help you monitor and provision your SDN.	YES	NO
Most advanced network management tool to analyze and reconfigure your network as your needs evolve.	YES	NO
On-line network management capability to test line transmission levels and retrieve results.	YES	NO
Industry standard (CCITT) EDI electronic bill delivery and billing flexibility to meet individual needs.	YES	NO
Full implementation of Primary Rate Interface and ISDN.	YES	NO
Virtual network Users Group where customers provide input for future product development.	YES	NO
Clear 64 kbps data transmission capability.	YES	NO
Virtual private network with a calling card access from a touch-tone or rotary phone for 0+ dialing (2-step dialing).	YES	NO
Remote access capabilities that provide you with your own distinct 800 number to access your network for 7-digit and 10-digit dialing.	YES	NO

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MCI[®] claims their customers are happy with Vnet.SM Then why have so many MCI customers signed up with AT&T SDN?

Did you know MCI advertising says their customers rate MCI Vnet very highly? But, perhaps, not highly enough. Because of the hundreds of customers who switched to AT&T SDN in the past year, over one-third came from MCI.*

In fact, AT&T's virtual network customer base increased over 400% last year alone. And more than half the customers who signed up had used other carriers' services. Like MCI Vnet and Sprint VPN.SM

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And that's just the beginning. Other AT&T exclusives that are available now are listed in the chart on the left.

So the next time some MCI salespeople tell you how happy their customers are, ask them this:

Why have so many MCI customers changed to AT&T SDN?

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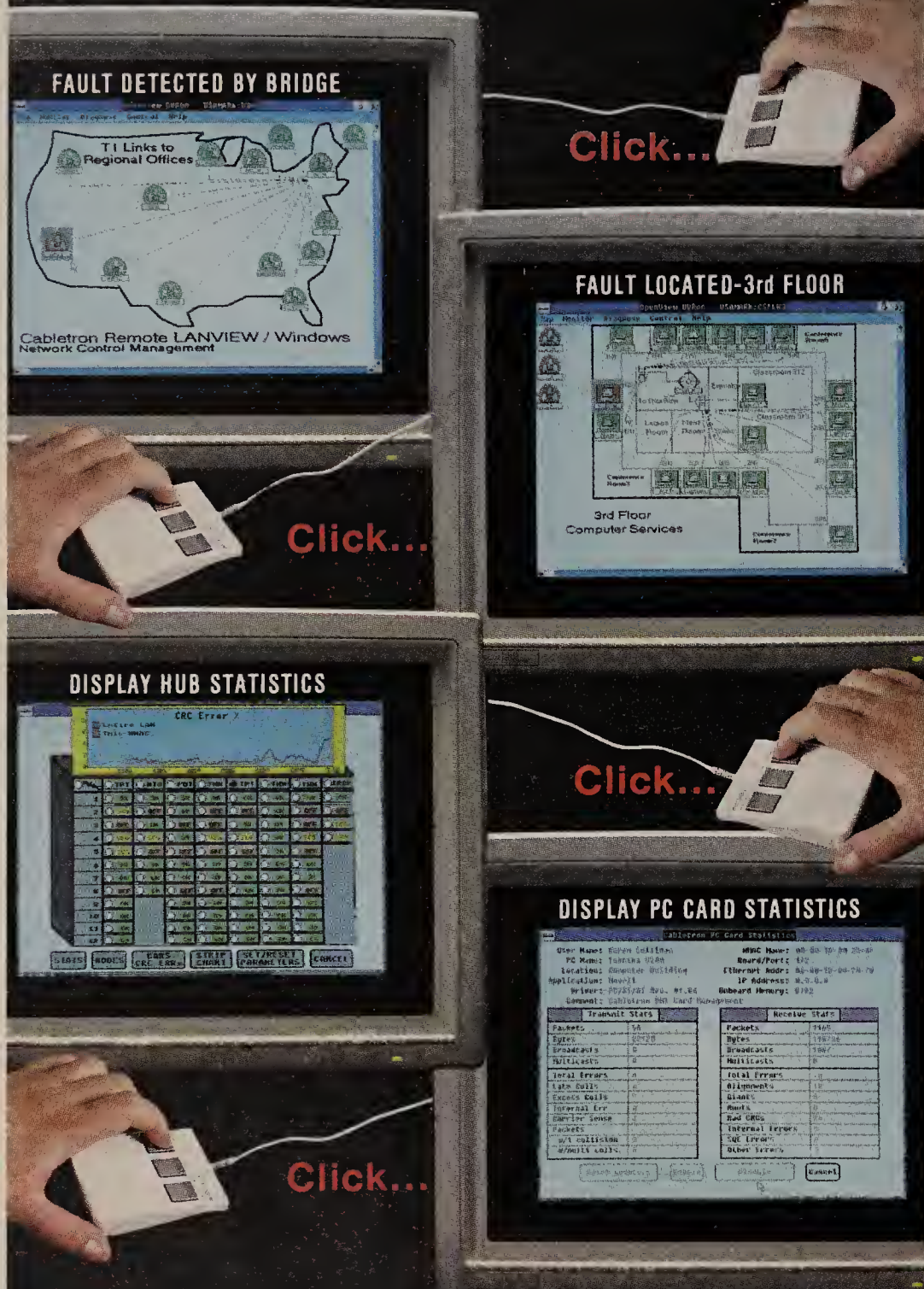
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Hospital net links Novell, DG systems

continued from page 23

4699 Ethernet Local Bridge. Terminals and peripherals on seven floors are linked to the backbone via fiber-optic transceivers and terminal servers, according to Steven Grider, DG's network consultant who designed the Women and Infants network.

In turn, the backbone will be connected via a 10M bit/sec microwave link from Microwave Bypass Systems, Inc. to a DG Eclipse MV40000 superminicomputer and an AViion Model 6200 multiuser network server in the hospital's data processing center two blocks away.

The AViion 6200 is running Meditech Information Technology, Inc.'s Magic operating system as well as Meditech's Laboratory Information System application software, which is used to process information generated by lab test machines. The MV40000 superminicomputer running DG's proprietary AOS/VS II operating system will be used for all other hospital applications.

Women and Infants Hospital is currently evaluating several software products that will enable it to link the NetWare LANs to the DG minicomputers so hospital users can access large clinical and financial data bases, Reirden said.

One software product under consideration is a Novell/DG-developed product that lets DG minicomputers act as NetWare file servers. The hospital plans to link the LANs to the minicomputers within six months, Reirden said. However, there are no plans to allow the workstation users to access the LANs.

Initially, the three NetWare Version 2.15 LANs will be used by hospital managers for general office automation, administrative and electronic mail applications, Reirden said. The networks will also handle all charge information for patient billing, and one of the LANs will be used to schedule ambulatory surgical procedures that don't require hospitalization.

The most obvious benefit of the networks will be the reduction in admission lines, Reirden said. "Unless they're about to give birth, almost all of our patients have had to wait in lines to be admitted or just to come in for a visit to be processed for routine tests."

The combination of dumb terminals and networked microcomputers in hospital departments will eliminate lines by allowing Women and Infants Hospital to admit patients at the point of service.

The network will also speed the availability of test results to hospital personnel. "Prior to this, our staff had to phone the lab for routine results and wait for the lab technician to search for the correct paper log," Reirden said. "Now the information will be available to the staff at their PCs or terminals." Similarly, the Ethernet backbone will be used to deliver updated patient information to the terminals at nursing stations throughout the hospital.

Reirden expects the Women and Infants Hospital network to be fully operational sometime in May. "Our long-range goal — a year or 18 months from now — is to have doctors throughout Women and Infants utilizing the networks to consult with their colleagues on specific cases or exchange information with the hospital administrators," he said. **Z**

Gateway gets better WAN support

continued from page 23

Meanwhile, Novell — in keeping with its policy of getting out of the hardware business — has turned the rights to Fast-Path over to Cambridge, Mass.-based Shiva Corp.

To communicate via TCP/IP, the new software makes use of IP tunneling. The AppleTalk packets are encapsulated within IP packets so they can pass through IP routers that support only TCP/IP.

The tunneling approach has the added benefit of keeping AppleTalk chatter on the AppleTalk side of the gateway so it won't bog down the TCP/IP backbone. According to Stabler, AppleTalk tends to be very chatty.

"This tunneling architecture will be extensible to other types of protocols — DECnet and X.25, for example — in the future," Stabler said.

The ability of AppleTalk users to tunnel at will through a big TCP/IP internetwork presents security problems and can result in users being confronted with a long and confusing list of remote AppleTalk zones and devices.

These issues are addressed by a filtering feature that lets individual users focus on certain zones and devices. Without this filtering, dozens or even hundreds of AppleTalk zones on a large internetwork would appear in the AppleTalk Chooser window of the user's Macintosh.

The support of AppleTalk Phase II in Release 1.5 of the GatorBox system software increases the theoretical maximum number of Macintoshes on a single physical Ethernet from 254 to nearly 16 million. The GatorBox still supports Phase I, en-

abling it to be used to bridge smaller Phase 1 and larger Phase II LANs together.

The new GatorBox software also uses TCP/IP's Routing Information Protocol to locate network addresses and propagate routing information automatically to other routers and host computers. Another new feature is IP subnetting, which lets an AppleTalk LAN behind the GatorBox appear as a separate IP subnet.

Previously, the GatorBox allocated a range of IP addresses from the IP backbone to the AppleTalk segment, thus reducing the number of available IP addresses. When the AppleTalk LAN acts as a separate IP subnet, it has its own network number and addresses.

Release 1.5 of the GatorBox system software will be available free of charge to registered GatorBox users beginning next month. The price of a GatorBox with the new software is \$2,795.

Along with the new system software, Cayman introduced an upgrade to its GatorShare product. This software turns the GatorBox into a file-sharing gateway between Macintosh users on AppleTalk LANs and any Unix system that supports Sun Microsystems, Inc.'s ubiquitous Network File System.

Enhancements to Release 1.5 of GatorShare include support of Apple's AppleShare PC, which lets users of DOS-based personal computers go through a GatorBox to store and share files on Unix systems. Another new feature is byte-range locking, which enables 10 to 20 users to simultaneously access a multiuser application through a single GatorBox gateway.

GatorShare 1.5 will be available in May at a price of \$1,995. However, registered GatorBox users can obtain the upgrade for free. **Z**

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Worth Noting

According to the Electronic Mail Association, there are currently more than 8.6 million electronic mail users in the U.S. These users send more than 1.5 billion messages per year.

Association Watch

The **National Automated Clearinghouse Association (NACHA)** will hold its 1990 conference, titled "NACHA 90 Targets Corporate Needs," at the Sheraton Washington Hotel in Washington, D.C., April 29 through May 2.

Some of the topics to be covered at the four-day conference include electronic data interchange, security, legal and audit issues, and trade payments. One-day workshops offer information on state tax formats, new additions to the Uniform Commercial Code, direct deposit and automated clearinghouse rules. Registration fees are \$625 for NACHA members and \$725 for nonmembers. The cost to attend one of the workshops is \$75. To register, call (703) 742-9190.

The **Association of Banyan Users International (ABUI)** will also be holding its spring conference and exposition at the Sheraton Washington Hotel April 29 through May 2.

Howard Berkowitz, principal consulting engineer for the Corporation for Open Systems International, will deliver the keynote address. Sessions will focus on network security issues, and focus groups will meet to discuss specific aspects of Banyan Systems, Inc.'s VINES local-area networks.

Registration for the exposition and conference costs \$470 for ABUI members and \$575 for nonmembers. Exposition-only registration costs \$10 at the site and is free in advance. To register, call (508) 443-3330. **Z**

Former Drexel execs join systems integration firm

IS employees target finance firms for outsourcing.

By Joe Panepinto
Staff Writer

NEW YORK — Three network executives cast adrift by the sinking of junk-bond king Drexel Burnham Lambert, Inc. have regrouped at a systems integration firm here and are taking aim at financial services companies on beleaguered Wall Street.

"In financial services, costs are high, profits are low, revenues are falling off, and the time is ripe to outsource [information systems] because we can do things cheaper," said Chuck Coleman, former vice-president for communications planning at Drexel. Coleman is now the director of corporate communications at Republic Management Services (RMS) Technologies, Inc., a small systems integration and network management firm based in Manhattan.

Coleman is one of more than 500 IS employees laid off in February when Drexel fell into bankruptcy and closed up shop ("Drexel downfall puts 500 IS employees out of work," *NW*,

Feb. 19). He and his former Drexel colleagues are hoping to turn the turmoil on Wall Street to RMS Technologies' advantage by coaxing big securities firms to outsource parts of their IS operations, Coleman said.

RMS Technologies, founded 13 years ago, manages network

"In financial services, costs are high, profits are low, revenues are falling off, and the time is ripe to outsource IS," Coleman said.

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operations primarily for government agencies, including two large National Aeronautics and Space Administration sites. *(continued on page 28)*

BOOK REVIEW

BY ERIC SCHMALL

Muddled writing hampers management treatise

Managing as a Performing Art, Peter Vaill (San Francisco: Jossey-Bass, 1989), \$20.95.

This is not the kind of book that appeals to readers who want their management reading like fast food: predictable, simple and briefly sustaining.

In a series of essays, Peter Vaill serves up a complex dish — a bouillabaisse of musings and reflections on management that will likely prove to be a turnoff for the meat-and-potatoes kind of reader. He challenges traditional approaches to the subject, confronting many common assumptions. Unfortunately, the book never gels into any coherent conclusions. It stands as an amorphous mass of observations, conjectures and proto-theories that need to mature.

That's a tragedy since Vaill, a professor of human systems at George Washington University's School of Government and Business Administration, opens with the hope that down-to-earth managers would find the book interesting. Many of his insights are compelling, even brilliant. But his esoteric discussions and convoluted writing will deny him a wide audience.

Vaill portrays managers as being swept along by constant change, not unlike canoeists buffeted by permanent white water currents on an unpredictable river. While managers keep expecting that a smoother passage lies just past the immediate crisis, Vaill predicts that they will never escape the rapids of late 20th century organizational and technical change.

(continued on page 28)

Schmall is a network systems manager for an insurance holding company.

MANAGEMENT PROFILE

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"Only a few companies have the executive-level commitment necessary to make EDI a strategic part of their business. Most others are reluctant to commit the time, resources and money that a full-scale EDI implementation would require. It's a scary thing for most companies."

Kenneth Hutcheson
Chairman of ANSI X12 Committee

X12's Hutcheson talks of EDI's future

Formed to create a unified set of cross-industry EDI transaction formats, ANSI's X12 committee has grown significantly in the past few years and is now considered the preeminent electronic data interchange standards group in the U.S. Also, as a sponsor of the North American Electronic Data Interchange for Commerce and Transport (EDIFACT) Board, X12 is playing a key role in the development of a single worldwide EDI standard.

The current chairman of X12 is Kenneth Hutcheson, EDI supervisor at E.I. du Pont de Nemours & Co. in Wilmington, Del. *Network World* Senior Writer Wayne Eckerson met recently with Hutcheson at EDI '90, X12's third annual conference and exhibition, in Las Vegas to discuss X12 and the future of EDI.

What are the most pressing concerns facing EDI users?

The overriding impediment to the growth of EDI is that most companies have yet to integrate EDI into their business applications. Many companies have EDI in production, but most aren't using it strategically, as a prevalent way of doing business.

Only a few companies have achieved the kind of executive-level commitment necessary to make EDI a strategic part of their business. Most others are reluctant to commit the time, resources and money that a full-scale EDI implementation would require. It's a scary thing for most companies.

X12 has been criticized by some as moving too slowly. Is this a legitimate criticism?

Slowness is a product of the process. People who [think] they

can come into X12 or any ANSI committee and create streamlined results are just kidding themselves.

That doesn't mean that we can't improve. We can, and we will. But there is a certain amount of baggage that goes along with the consensus process, where you're trying to solicit input from all the people who would be affected by any standard that's developed. [Slowness] is a strength rather than a weakness.

There are two classes of people who have problems with the

"People who [think] they can come into X12 and streamline are kidding themselves."

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X12 process. There are those in an extreme hurry, who want to make sure their company is ahead of the competition. The other group usually comes from industry [EDI standards] groups. They're used to a closed process, which they think is better.

We now publish subreleases of draft transaction standards three times a year. That's fairly responsive. In fact, there are people who claim we're out of control and [who want] to slow this down. These people say companies can't keep up with us. You can't win either way.

What steps have you taken to manage the growth of the X12 committee and make it a more efficient body?

(continued on page 61)

Muddled writing hampers treatise

continued from page 27

The paradox of these times, according to Vaill, is the demand that managers exercise greater control over things that are more uncontrollable than ever.

He examines and discards many modern and traditional answers to meeting these problems. He argues that most attempts at singling out managerial competencies and then training people in those subjects will not prepare them adequately.

Vaill has little patience with quick-fix approaches to management, such as "excellence" and "one-minute management," since they offer shallow explanations for much deeper problems. The

process of managing people is so complex that cookbook formulas just don't work. In this case, more creative approaches to management are in order.

The closest Vaill comes to settling on any one approach is to advocate a humanistic approach, one that emphasizes leadership and teamwork, and centers on caring deeply for people. He advances the need for living with ambiguity and recognizing that not all management problems can be solved with rationalism.

While many of his suggestions strike a deep resonant chord, Vaill's style becomes a roadblock to greater understanding.

In one particular passage, where he criticizes the typical list-of-functions approach to management, he writes: "This whole process is embedded in time and is

subject in the real time of its operation to all the turbulence and change that surround it, that indeed suffuse it, because the turbulence and change are within action takers as much as they surround them. Simply to name the function to be performed as though it were the action ignores all of this richness of the actual action taking process and, worst of all, ultimately masks the richness and leads to an empty model of what the action-taking process is."

Passages such as that take a good deal of effort to work through. This murky prose, combined with a lack of any definitive conclusions, make this book much more appropriate for postgraduate seminars on management theory than for managers trying to improve their skills. **Z**

Former Drexel execs join integration firm

continued from page 27

cording to Coleman, the company currently has a \$300 million backlog in orders in addition to a multimillion dollar contract it just landed to manage the Federal Aviation Administration's IS systems.

Two other recently released Drexel employees, Fred Edelstein, former vice-president of advanced technology, and Gary Adams, a former assistant vice-president of advanced technology, formed a new division of RMS Technologies called RMS Data Services, Inc. The unit will focus on developing systems for use on Wall Street.

At RMS Data Services, Edelstein and Adams will continue work they began at Drexel developing analytical applications for Reuter Information Service, Inc.'s Market Feed 2000, an equity and fixed-income trade information service.

A fourth Drexel alumnus, George Bryant, made the jump to RMS Technologies last August when he "saw the handwriting

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See The FAXNet Form on Page #67

Firms such as RMS Technologies are well suited to begin moving into the IS departments of large financial institutions on Wall Street because they can reduce redundant operations and increase economies of scale.



on the wall" for the securities giant.

Bryant said he believes the days of large network departments in the financial services industry are numbered.

"We [in IS at brokerages] were essentially seeing ourselves becoming dinosaurs in the industry," said Bryant, who is currently a technical director for market services at RMS Technologies. "Doing IS from the inside is inefficient. An outside vendor doing IS work for firms downtown is a lot more efficient."

Bryant and Coleman said they believe that firms such as RMS Technologies are well suited to begin moving into the IS departments of large financial institutions on Wall Street because they can reduce redundant operations and increase economies of scale. Coleman said farming out IS to a systems integrator will let financial institutions concentrate on the brokerage business. "All of these firms are finding that their main business is not IS," Coleman said. "They'll find that they can just as easily outsource with somebody that is good and get the same service."

Outsourcing and systems integrators have been blamed for the slashing of IS personnel at a number of companies. However, Coleman said RMS Technologies, which maintains a staff of less than 1,200, will try harder to keep IS personnel in place than his former employer did.

"Quite frankly, if we are successful, we'll need more people, and we're going to go in and pick up some more guys from Drexel," Coleman said. "Also, we're not the kind of company that would go into another company and just make people hit the bricks." **Z**

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

“If you were in East Berlin and you wanted to [reach someone in] West Berlin, it'd be easier to get in a car and drive. Calling within East Germany is a lost cause.”

Eugene Sekulow
President

Nynex International Co.
Member of the U.S. Task Force on
Telecommunications and
Broadcasting in Eastern Europe

World News

Nippon Telegraph and Telephone Corp. (NTT) recently detailed plans to procure broadband Integrated Services Digital Network systems in preparation for a roll-out of broadband ISDN services by 1995.

Broadband ISDN, which is based on an emerging Consultative Committee on International Telephony and Telegraphy-defined technology dubbed Asynchronous Transfer Mode, supports switched voice, data and video transmissions at speeds up to 145M bit/sec. No carrier currently offers commercial broadband ISDN services, although several U.S. carriers say they plan to begin deploying the technology on a trial basis by the middle of the decade.

In a request for proposal issued earlier this month, NTT said it is looking to procure an Asynchronous Transfer Mode node system, which will process broadband ISDN transmissions and establish broadband ISDN connections, as well as an Asynchronous Transfer Mode link system, which will multiplex transmissions from various user terminal devices into a single broadband ISDN circuit.

NTT said it wants to work with a supplier to use these systems to supply commercial broadband ISDN services. NTT said it hopes to make these services available by 1995 or sooner, if the technology can be adequately developed. ■

Update on Eastern Bloc public nets

Infrastructure

- Pre-World War II central office switches.
- No fiber-optic or digital technology.
- Limited spectrum use for private microwave, mobile cellular or radio communications.

Service levels

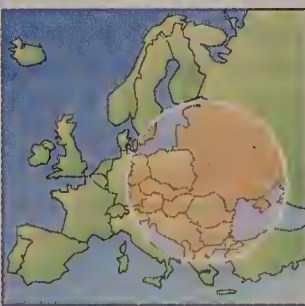
- 10- to 15-year wait for residential telephones.
- Call completion rates average 15%.

Regulatory environment

- Measures to allow competition and to restructure tariffs and licensing procedures only under preliminary consideration.
- Governments expected to be very accommodating to foreign firms with large domestic joint ventures.

Reforms needed

- Investments of \$400 million to \$800 million per country to bring public networks up to par with those of developed countries.
- Total overhaul of regulatory and licensing systems needed, especially for radio spectrum management.



SOURCE: U.S. STATE DEPARTMENT TASK FORCE ON TELECOMMUNICATIONS AND BROADCASTING IN EASTERN EUROPE
GRAPHIC BY SUSAN J. CHAMPENY

Eastern Bloc public nets suffer neglect

U.S. State Dept. tour finds communications in Eastern Europe plagued by outdated equipment.

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — Systematic, institutionalized neglect has decimated Eastern Bloc public nets, making them among the worst in the world, according to participants in a recent U.S. government-led fact-finding tour of four Eastern European countries.

Communist government policies have forced carriers in Eastern Europe to make do with World War II vintage equipment. Call completion rates are around 15%, and there are 10- to 15-year waiting lists for new telephone service, the group said.

“It was a matter of public policy that there not be effective communications,” said Eugene Sekulow, president of Nynex International Co. and one of the tour participants. “Communications was a light these tyrannies could not stand.”

The tour, sponsored by the U.S. State Department's Task Force on Telecommunications and Broadcasting in Eastern Europe, lasted 3½ weeks. Countries visited included Czechoslovakia, East Germany, Hungary and Romania. More than a half dozen top U.S. government and industry officials participated, and many of them presented their findings at a public hearing sponsored by the State Department here.

Sekulow and other tour members said that in the past, even though public networks in the Eastern Bloc countries were profitable, the Communist governments plowed the profits into other operations, such as mail delivery or manufacturing. The re-

sult was that few new central office switches have been purchased in the more than 40 years of Communist rule, forcing carriers to rely on obsolete equipment.

The main, central office switch in Bucharest, Romania, for example, could be a museum piece, Sekulow said. Built in 1927, the electromechanical switch is maintained by elderly men, working in a dimly lit room, he said. No replacement parts are available for the switch. Workers must either jury-rig parts from other materials or refashion worn-out parts.

Tour participants said that pre-World War II equipment typified the public network infrastructure in the countries visited. While more modern equipment is available in some areas, the group said that was not the norm. No digital switches are used in the Eastern Bloc.

In a report presented at the conference, the Task Force estimated that it will cost \$400 million to \$800 million per country to bring Eastern Bloc public networks up to par with those in the developed world.

U.S. businesses interested in trying to run private networks into this part of the world will find it difficult because of the feeble telecommunications infrastructure, according to tour participant Travis Marshall, a senior vice-president of Motorola, Inc.

Although it should be fairly easy to obtain private-line satellite services into these countries because of capacity on Western
(continued on page 30)

International virtual nets to support limited functions

Lack of foreign services hampers deployment.

By Barton Crockett
Senior Editor

While emerging international virtual network services should greatly expand users' service options, they are not likely to equal the functionality of domestic virtual net services.

Difficulties integrating U.S. services with foreign carrier offerings will limit the functionality of international virtual nets for several years to come, making them less desirable as alternatives to private-line networks.

“It's really a question of what the foreign carrier chooses to support,” said Serge Wernikoff, senior vice-president of corporate development at MCI International, Inc. “On the foreign end, users will only be able obtain services that the PTT is willing to provide.”

Debut this year

Currently, AT&T is the only U.S. carrier offering an interna-

tional virtual net service, which it introduced in 1986. The service, Global Software-Defined Network (SDN), enables domestic SDN customers to extend private network-like features — such as two-way seven-digit corporate dialing plans — to London sites without requiring use of international leased lines. SDN establishes the international links on a call-by-call basis.

AT&T said it hopes to offer a similar service to Japan and Australia this summer.

MCI Communications Corp. said it plans to support London with its domestic Vnet service by year end. US Sprint Communications Co. said it plans to roll out its International Virtual Private Network (IVPN) service in the third quarter (“US Sprint to unveil int'l VPN service at ICA show,” NW, April 2).

While no foreign carrier currently offers a domestic virtual
(continued on page 30)

European countries give nod to portable telephone

By Ralph Bancroft
IDG News Service European Bureau

LONDON — Several European countries have recently pledged to support a British standard for a type of digital portable telephone called Telepoint.

In a memorandum of understanding signed here last month, public telephone operators from Belgium, Finland, France, Portugal, Spain and West Germany agreed to set up or trial Telepoint services by year end using a British Telepoint standard known as Common Air Interface (CAI).

Telepoint services allow subscribers to use small, portable, digital handsets to make outgoing calls in public areas such as railway stations, hotels and shopping malls.

The telephones are supported by radio base stations, which route calls to their final destination via the public telephone network. Telepoint services can also be used in offices as cordless extensions to a private branch exchange.

The U.K. is one of the first countries to develop an active Telepoint marketplace. Three rival Telepoint networks began operating in the country earlier this year using the CAI standard, which specifies the use of radio

frequencies in the 864- to 868-MHz band.

Europe-wide service

The memorandum of understanding signed last month will allow the development of services that enable Telepoint subscribers to use their handsets anywhere in Europe while being billed via their local telephone

The U.K. is one of the first countries to develop an active Telepoint marketplace.

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company or Telepoint operator.

By 1993, the signatories expect to make Telepoint services available in all major cities, railway stations and airports in their respective countries.

The signatories also said they hope that other countries will follow their lead in using the CAI standard, thereby creating an international marketplace for Telepoint services. ■

Eastern Bloc public nets suffer neglect

continued from page 29

European satellites, last-mile links from shared satellite earth stations to user locations may be difficult to obtain because of the poor quality of terrestrial networks.

Using private microwave systems to bypass the local carrier and link satellite dishes directly to end-user locations is an option, but poor radio spectrum management limits its viability.

Record keeping for spectrum allocations is often inadequate, and large chunks of the frequency spectrum have been dedicated to military operations. The result is that radio capacity for private microwave, radio dispatch and cellular systems is not

available in some areas. However, Sekulow and Marshall said, Eastern Bloc carriers said they will accommodate U.S. users that set up operations in Eastern Europe and that efforts are under way to improve radio spectrum management.

As for the future, Eastern Bloc countries face an uphill battle in obtaining the money needed to improve their public networks. New public cellular systems in the Eastern Bloc would only marginally improve telephone services, according to Sekulow and Marshall. This is because cellular systems will use existing network facilities to complete many of their calls. No Eastern Bloc country currently has a cellular system, though systems have been proposed for Czechoslovakia and Hungary. **Z**

Int'l virtual nets support limited

continued from page 29

network service, many plan to. And the three major U.S. carriers say they will interconnect with these offerings.

In the meantime, AT&T Global SDN customers have to lease local access lines from British Telecommunications PLC to tie London sites to a gateway switch for AT&T's international network. Global SDN subscribers pay a onetime fee of \$99 to AT&T and a \$1,600 quarterly local access fee to British Telecom.

Although Global SDN offers discounts exceeding 40% over standard international long-distance calling rates, several popular SDN features available domestically

are not available over the international link.

Users cannot receive call detail records for calls originating from London or use authorization codes to restrict calling privileges.

Customized billing and network performance reports are not available because British Telecom, which calls its end of the Global SDN link "CitiDirect," does not support these features.

Some improvement

MCI promises to go a step beyond AT&T's existing Global SDN offering by interconnecting its Vnet virtual network service with a service called FeatureNet, which British Telecom plans to introduce by year end.

Basically, the FeatureNet link will mirror the CitiDirect connection, except that the FeatureNet switch in London will be digital and will be able to support call detail records, customized billing and network performance reports.

Even so, users will not be able to use MCI's highly touted Vnet network management product, the Integrated Network Management System (INMS), to control virtual net sites in London, according to MCI International's Wernikoff.

INMS enables users to track trouble report tickets, change calling privileges and

Serious About Workstation Networks? Check This Out.

	Fibermux	Cabletron	Synoptics	Ungermann-Bass
10BaseT compliant?	✓	✓	No	✓
Multiple segments and rings in same hub?	✓	No	No	No
Ethernet, Token Ring and IBM 5250 in same hub?	✓	No	No	✓
Full redundancy?	✓	No	No	No
SNMP based Network Management?	✓	✓	✓	No
FDDI shipping now?	✓	No	No	✓
Typical price per port (with network management)	\$364-\$701	\$454-\$883	\$574-\$1569	\$990-\$2200

If enterprise networking is your charter, then you expect to install serious solutions. That's why Fibermux designed Crossbow with sophisticated features not found in other products. Features that facilitate building and managing enterprise workstation networks.

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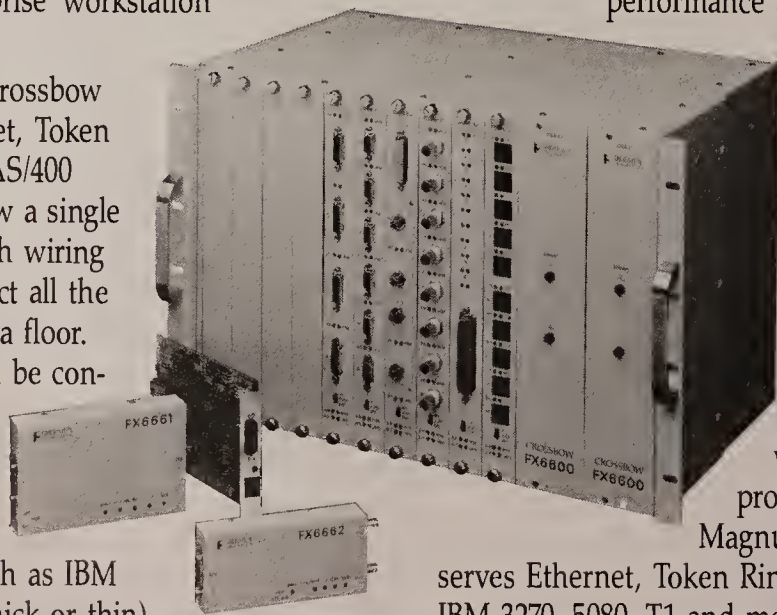
Large networks like these need powerful

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See The FAXNet Form on Page #67

NETWORK WORLD • APRIL 23, 1990

A British Telecom spokesman said the carrier plans to phase out all CitiDirect services in favor of FeatureNet.



monitor call completion rates via on-line connections to MCI's network control center.

Although the domestic Vnet service offers discounted calling rates over standard switched services, Wernikoff said MCI may not offer similar discounts internationally. He said users might be willing to pay a premium for dial-up international services that support call detail records, customized billing and network performance reports.

A British Telecom spokesman said the carrier plans to phase out all CitiDirect services eventually in favor of FeatureNet, which means that AT&T will get the same benefits as MCI.

US Sprint to outdo them all?

Bill Burgess, US Sprint's vice-president and general manager of international services, claims that his company will go further than MCI and AT&T by extending, at a minimum, all of the carrier's domestic VPN features to the U.K. and Hong Kong.

Users will obtain these services by maintaining T-1 or European T-1 links to points of presence operated by subsidiaries of US Sprint business partner Cable & Wireless PLC in both countries.

But a spokesman for Cable & Wireless in London would not confirm this and insisted that any virtual network offering it supports will not be the same as US Sprint's VPN offering. US Sprint plans to detail its IVPN offering publicly at the International Communications Association's annual conference and exhibition next month in New Orleans. **Z**

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Artisoft adds voice support to LANtastic

Artisoft, Inc. recently upgraded its LANtastic Network Operating System to support voice messaging across a local-area network.

The company said that **LANtastic Version 3.0** is the first LAN operating system to support voice traffic across a LAN. The operating system can run on Ethernet, token-ring, Arcnet or Artisoft's proprietary 2M bit/sec LANs.

By installing Artisoft's eight-bit LANtastic Voice Adapter in IBM Personal Computers, users of LANtastic Version 3.0 will be able to exchange voice mail with other users on the LAN.

LANtastic Version 3.0 is expected to be available by June 1. Version 2.0 users can upgrade to 3.0 for \$99.

Artisoft, Inc., 575 E. River Road, Tucson, Ariz. 85704; (602) 293-6363.

AT&T adds applications to low-end System 25 PBX

AT&T recently unveiled software that adds voice-messaging, call accounting and system administration features to its low-end System 25 private branch exchange.

Integrated Solution II has three components that run on an AT&T Unix microcomputer based on the Intel Corp. 80386SX microprocessor: **Audix Voice Power System, Call Accounting and Advanced Administrative Software.**

Audix Voice Power System enables users to send messages to as many as 150 extensions and retrieve messages from any push-button phone. Call Accounting gathers records of all System 25 activity for applications such as client billback. Advanced Administration Software lets users perform phone and data terminal moves and changes.

Integrated Solution II is available now. Pricing for the hardware and Audix Voice Power System software is \$15,000. Call Accounting software costs \$2,000, while Advanced Administration Software costs \$500.

AT&T, 99 Jefferson Road, Parsippany, N.J. 07054; (800) 247-7000.

Network General monitor tracks activity on Ethernets

Watchdog reports on LAN, workstation traffic.

By Walter Sweet
West Coast Correspondent

MENLO PARK, Calif. — Network General Corp. recently unveiled a local-area network monitor that allows net administrators to spot abnormal activity at individual workstations and oversee traffic on a LAN.

The new Watchdog Network Monitor is software loaded onto an Ethernet interface board that resides in any IBM Personal Computer AT or Personal System/2. Network managers do not need to dedicate a microcomputer to run the Watchdog Network Monitor.

Watchdog Network Monitor provides four monitoring features: alarms, statistics, report generation, and cable and active workstation testing.

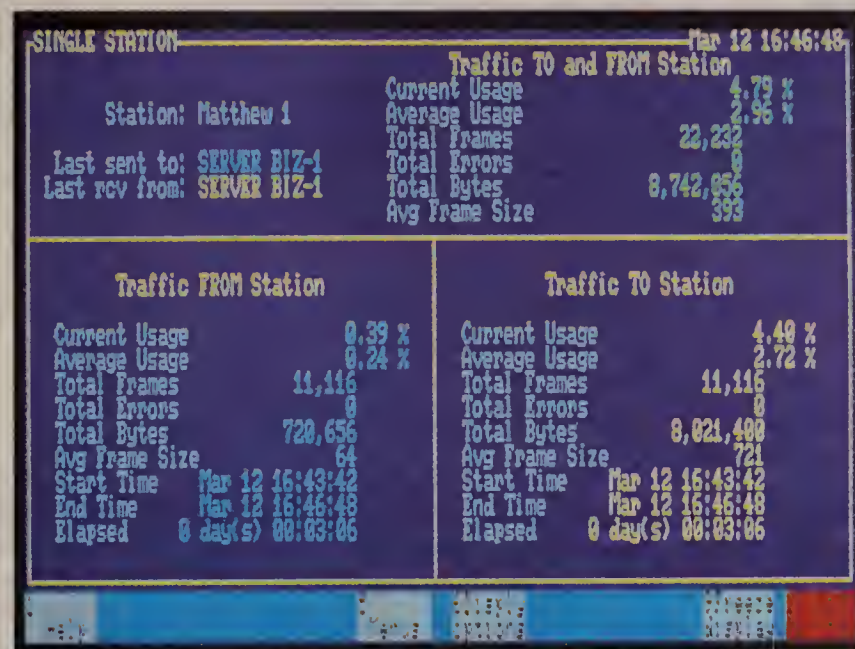
The product allows the net manager to set thresholds for the network and individual workstations that will set off audible or vi-

sual alarms when network conditions exceed those thresholds.

The Watchdog Network Monitor is targeted at LANs with 25 to 50 nodes and is priced at one-sixth of the cost of Network General's Sniffer protocol analyzer.

According to Richard Villars, an analyst with International Data Corp. in Framingham, Mass., "The Watchdog addresses a growing segment of the market — the small-scale network." The Watchdog Network Monitor is priced at \$1,995 and is available now.

Network General also introduced the Personal Computer WatchMaster software package, which allows a net manager to oversee multiple local and remote Watchdog Network Monitors from a central terminal. Personal Computer WatchMaster costs \$2,995 and is expected to be available in September. **■**



Network General's Watchdog monitors traffic at each LAN node.

Big vendors enter image mart with LAN offerings

By Tom Smith
New Products Editor

CHICAGO — Bull HN Information Systems, Inc., Hewlett-Packard Co. and NCR Corp. recently entered the imaging market with systems based on Unix servers that communicate with personal computer-based workstations over local-area networks.

The new imaging products, which were introduced at the Association for Information and Image Management (AIIM) show here, support Microsoft Corp.'s Microsoft Windows, which means users can display ASCII and im-

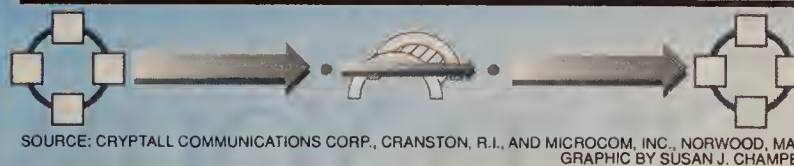
age data simultaneously in separate windows.

Bull unveiled an Ethernet-based system called ImageWorks, which uses a Bull DPX/2 Unix processor as an image server and IBM Personal Computers and Apple Computer, Inc. Macintoshes as image workstations.

The initial release of the product will support Microsoft Windows, while follow-up releases will support X Window System technology, according to Carol Kovitz, director of U.S. marketing and sales. Specific availability dates and pricing for the product, (continued on page 32)

Comparison of compression bridges

Product	Cryptall	Microcom	
	3000 Series CB	MLB/6000 Private Line Bridge	MLB/5000 Dial-Up Bridge
LAN interfaces supported	1 Ethernet	1 Ethernet or 1 token ring	1 Ethernet or 1 token ring
WAN ports, link speeds supported	1, 64K bit/sec	1 to 4, 9.6K to 2.048M bit/sec	1, 9.6K bit/sec
Average ratio of compression	4 to 1	2 to 1	2 to 1
Price	\$8,400	\$9,000 for single WAN link	\$8,800



Cryptall intros E-net compression bridge

Firm contends unit's 4-to-1 compression doubles that of rival offering; Microcom disputes claim.

By Tom Smith
New Products Editor

CRANSTON, R.I. — Cryptall Communications Corp. recently unveiled a remote Ethernet bridge that compresses data by an average ratio of 4-to-1.

With its new 3000 Series CB, Cryptall becomes only the second vendor to offer a compression Ethernet bridge. Microcom, Inc. of Norwood, Mass., has been selling its MLB/6000 Private Line Bridge and the MLB/5000 Dial-Up Bridge for more than two years. Microcom's bridges compress data by a 2-to-1 ratio.

By compressing data, the 3000 Series CB enables companies to use lower speed leased lines or increase their data traffic without buying more bandwidth.

The 3000 Series CB operates at the media-access control layer and performs protocol-independent bridging between Ethernets. Cryptall said the bridge will support token rings by mid-1990; Microcom's products already offer token-ring support.

Both companies' products support connection of a single Ethernet to wide-area network circuits. Cryptall's 3000 Series CB supports one WAN connection at speeds up to 64K bit/sec, according to Cryptall President Jeffrey Weiss.

The 3000 Series CB can also support higher speed lines, although users must request a separate software upgrade to do so.

Microcom's MLB/6000 supports as many as four WAN lines, each supporting speeds up to 2.048M bit/sec, the European T-1 rate. Microcom's MLB/5000 supports a single WAN line for transmission at 9.6K bit/sec.

Cryptall added new hardware and software to its 3000 Series

bridge family to support data compression. The 3000 Series also includes fractional T-1, as well as T-1, T-2 and T-3 bridges. By contrast, Microcom compresses data in software using a variant of the Microcom Network Protocol compression algorithm used in its modems.

Both vendors' bridges can compress data on T-1 channels, but not across the full T-1 bandwidth, they said. The 3000 Series CB can perform compression on lines up to 128K bit/sec or on two T-1 channels; the compression ratio is 4-to-1 at speeds up to 64K

By compressing data, the 3000 Series CB enables companies to use lower speed lines.

bit/sec, but it decreases to 3-to-1 when it reaches 128K bit/sec. Microcom's MLB/6000 can compress data on lines up to 64K bit/sec, or one T-1 channel, according to Eugene Chang, senior product manager for LAN products at Microcom.

Microcom said support for multiple WAN lines allows customers to increase bandwidth while using the same bridge. Cryptall's product makes growth more expensive because it requires users to spend an additional \$8,400 to purchase another 3000 Series CB to add WAN lines. But Weiss said Cryptall's other 3000 Series bridges, which (continued on page 32)

Cryptall intros E-net compression bridge

continued from page 31

have up to four WAN ports, will support compression by August.

"Our users' incremental cost is going to be much less than Cryptall's because with Cryptall, they have to buy a whole new unit," Chang said.

With Microcom's MLB/6000, which costs \$9,000, an interface with an additional WAN port costs \$1,900, he added. The MLB/5000, supporting a single 9.6K bit/sec link, costs \$8,800.

Cryptall's advantage is that it offers double the compression of Microcom, Weiss said. The 3000 Series CB compresses some data types even more. For exam-

ple, data supporting Digital Equipment Corp.'s Local Area Transport (LAT) protocol can be compressed at a 6-to-1 ratio.

"If you're taking something that's highly compressible and compressing it at 6-to-1, that doesn't take much magic," Chang said, claiming that the Microcom bridges can compress LAT data at a 16-to-1 ratio.

Let the user speak

Jackson Walker, a Dallas law firm, tested Cryptall's bridge head-to-head with Microcom's, as well as with another vendor's noncompression bridges.

According to Steve McHargue, systems manager at Jackson Walker, the 3000 Series CB offered significant performance advantages over the noncompression bridge but a less significant edge over Mi-

crocom's bridge.

Each bridge was used to transfer a 956K-byte ASCII file. The noncompression bridge transferred the file 30 miles from Dallas to Fort Worth, Texas, in 3 minutes and 29 seconds over two 56K bit/sec lines; the Cryptall bridge executed the same transfer over a single 56K line in 1 minute and 43 seconds; and the Microcom bridge transferred the file from Dallas to Houston, a distance of 260 miles, in 2 minutes and 30 seconds over one 56K bit/sec link.

"That's not fair," protested Microcom's Chang. "The longer the line, the higher bit error rate you'll get on it."

Weiss downplayed the significance of the different distances, saying propagation delay would be minimal.

"The distance would not account for all of that difference, so Cryptall seemed to perform a little bit better," McHargue said. The test was performed using Peter Norton Computing, Inc.'s Norton Utilities program to time the file transfers.

The test should not be equated with a laboratory experiment, McHargue said, because it did not take into account factors such as distance or other traffic running between sites and how that traffic would affect throughput.

Jackson Walker recently purchased the Microcom bridges, McHargue said, and the performance difference does not justify replacing them. The law firm's noncompression bridges, which are also relatively new, do not support a traffic load heavy enough to justify replacing them. ■

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Big vendors enter image mart

continued from page 31

which has been sold in Europe since 1988, will be released in the fourth quarter.

HP introduced the Advanced Image Management System, which uses DOS workstations and HP 9000 Series Unix-based processors as image servers. The workstations are linked to the servers over an Ethernet. The system runs under HP's NewWave office automation package, which is based on Microsoft Windows. The product will be available in May. Pricing ranges from \$40,000 for a single-user system to \$400,000 for a 20-user system.

NCR unveiled its Document Management System, which will use NCR Unix-based processors as image servers with OS/2 or DOS workstations linked over

HP's system uses HP 9000s as image servers.

▲▲▲

Ethernet and token-ring networks. The specific Unix processors to be used as servers have not been determined yet. The product supports Microsoft Windows and will be available in the fourth quarter of 1990. Pricing has not been set.

Other vendors also rounded out or enhanced their existing image product lines.

Unisys Corp., for example, introduced InfoImage Folder, a business document imaging system. Previously, the company offered separate imaging systems for check image processing and engineering documents. InfoImage Folder will initially use a FileNet Corp. Unix server and later will support Unisys' Unix-based U6000, as well as DOS-based workstations that communicate over an Ethernet. The system supports Microsoft Windows. InfoImage Folder will be available in the fourth quarter, and pricing will start at \$400,000 for a 15-workstation configuration.

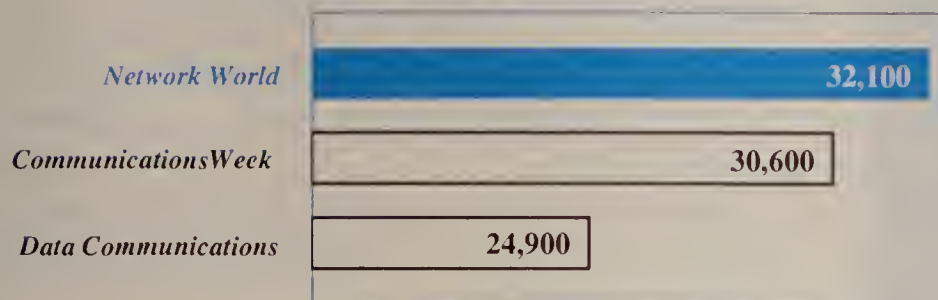
Eastman Kodak Co. announced its new ImageLink software, which will let users of DOS-based personal computers access images on the firm's Ethernet-based Kims 5000 system. Previously, users could only use DEC workstations with Kims 5000. ImageLink supports Microsoft Windows.

The software will be available in the third quarter. The software costs \$3,000. When bundled with workstations, pricing ranges from \$8,000 to \$14,000. ■

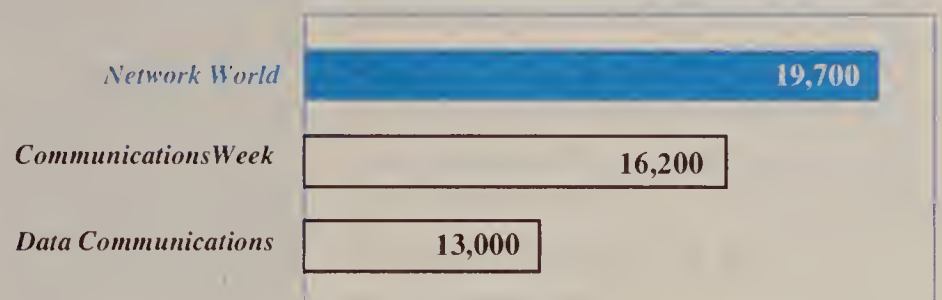
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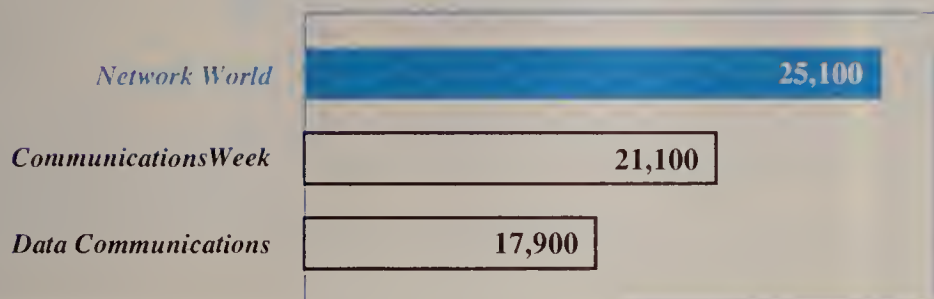
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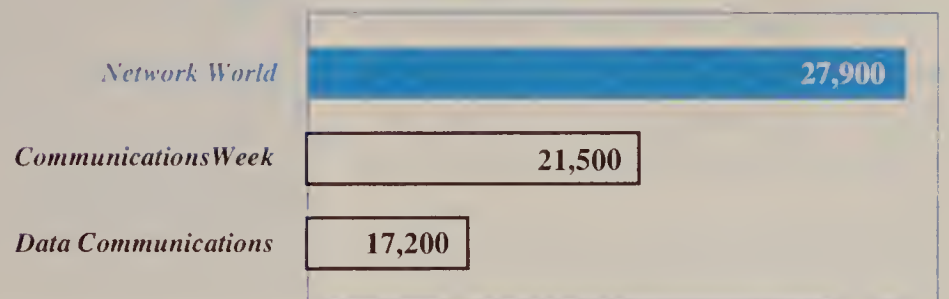
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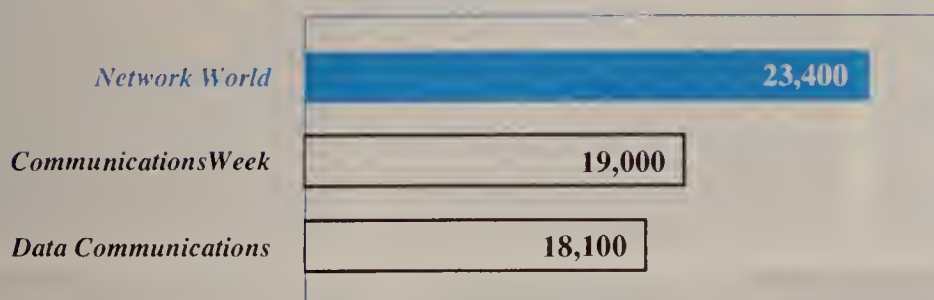
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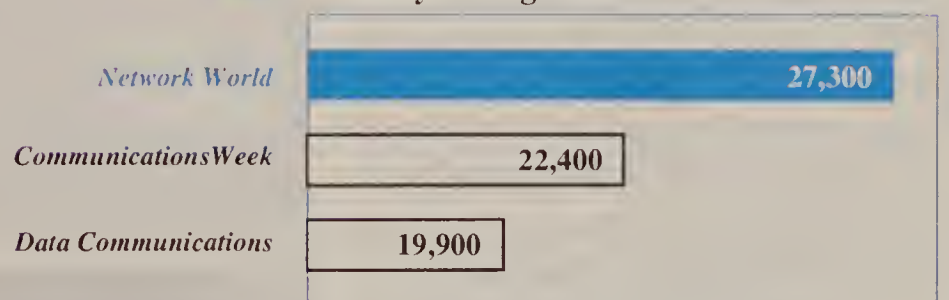
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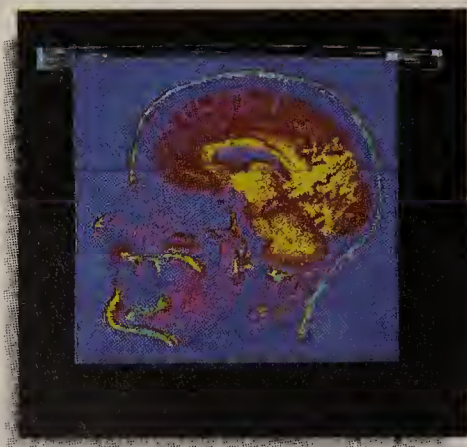


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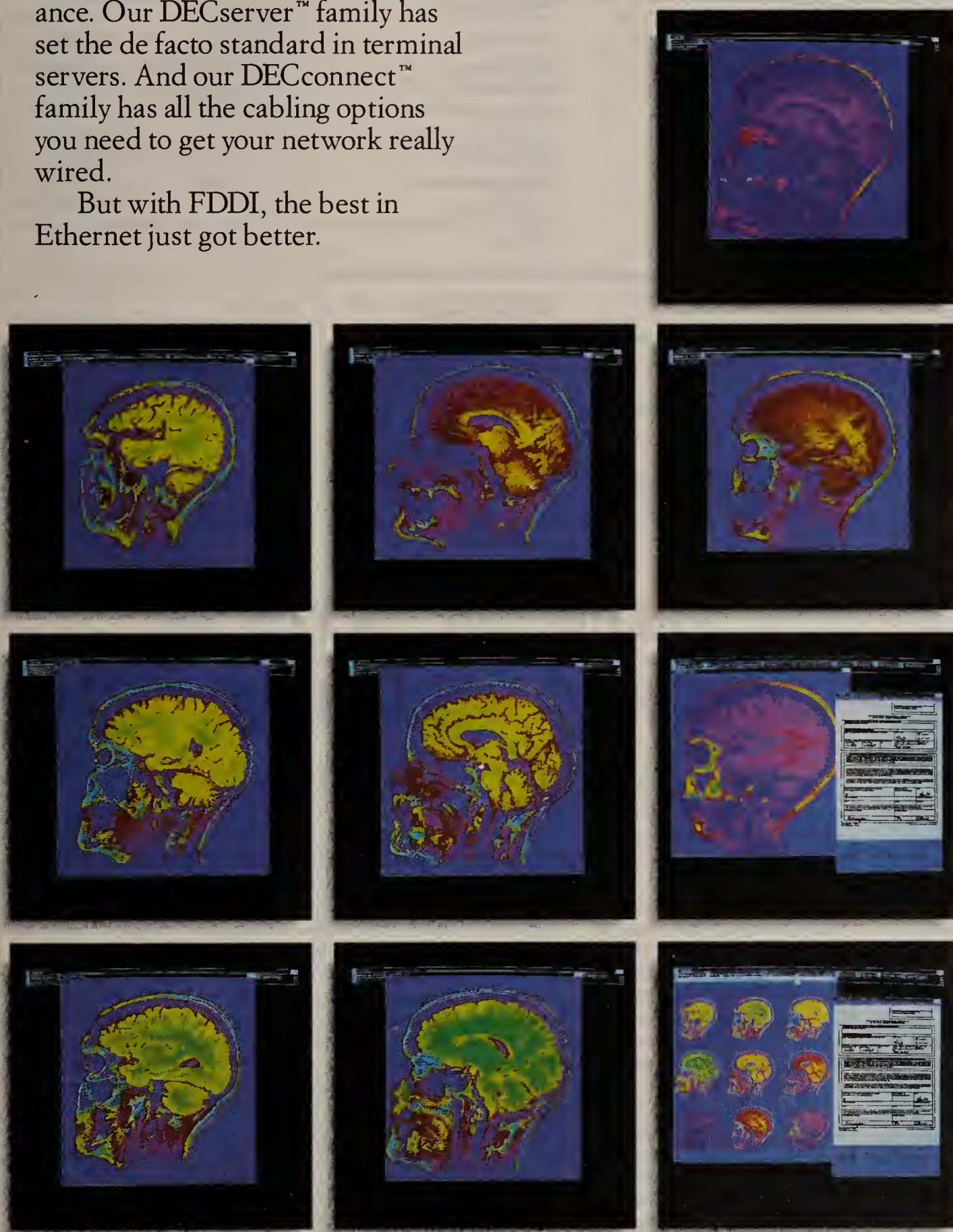
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OPINIONS

ANI

BY DAVE FUNDERBURG

Who has the greater right to privacy?

The automatic number identification (ANI) debate seems to revolve around two issues: Who has the greater right to privacy — the caller or the called party? and Do callers have the right to restrict distribution of their telephone numbers? Virtually all of the points raised under these two issues are clearly defined by regulatory precedent and generally accepted rules of telephone etiquette.

Telephone etiquette holds that the caller bear the burden of identification. The called party may refuse to answer the call, refuse to identify himself or terminate the call. The principles regarding the establishment of identity are not only enforced by tradition, they are specified in many state tariffs.

The issue of maintaining the right to control the distribution of one's telephone number is clearly established in any jurisdiction that provides the option of unlisted numbers. If the caller has an unlisted number, displaying this number to the called party would clearly violate the spirit and intent of the tariff regulating the provision of unlisted service. It would be challenging technologically, but not impossible, to substitute a unique identifier for the caller's unlisted telephone number.

If these two central issues to the privacy debate are so easily answered, why then does the debate rage on? Is it the potential for compiling and selling personal information about callers? While this may make marketing information easier to process, one only has to peruse the various directories and highly refined mailing lists available to realize that the data that ANI-type service provides adds virtually no new personal information to existing data bases.

The root cause of the uproar lies in the source and content of the information provided to the called party. The information received by the called party only identifies the line from which the call is being placed, not the actual identity of the caller. And therein lies the rub. Callers carry the burden of identifying themselves upon request. But does that obligation require that the called party receive information that could establish the location of the caller?

The issue of involuntary disclosure of even minimal information about the location of the caller provides the fuel for the debate. The provision of a uniform identification designation to the obvious candidates for exemption — such as nonprofit violence intervention agencies, law enforcement agencies and others with legitimate reasons for masking their locations — do not address the privacy issues as they relate to the individual.

As the called party, do I have a right to know where a call originated before I decide if I want to answer? As the caller, do I have the right to refuse to disclose my location or even provide the called party with false information, such as "I'm leaving the office now. Be there in an hour," when you're really at a pay phone across the street?

Is the issue really privacy or the reluctance we all have to relinquish part of the mask that the telephone traditionally provides? Each of us has had occasions, either business or personal, when it was beneficial to appear to be somewhere else when making a call. Does the caller have the right to withhold or misrepresent the originating point of the call in all cases?

If the answer is no, the real entertainment will come in watching the evolution of circumstances under which masking any identification of the originating line location is both legally and socially acceptable. We may even witness the birth of a new industry: the electronic voice version of mail forwarding, which would enable a caller to appear to phone in from the office no matter where he is. ■

Funderburg is president and senior consultant with DJF Associates, Inc., an independent telecommunications consulting firm in Atlanta.

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Johnson & Higgins
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Association of Data Communications Users

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Manager, Corporate Telecommunications
General Electric Co.

EDITORIAL

Facing the perils of integrated net management

As illustrated by speakers at the recent *Network World*-sponsored Network Management Solutions '90 conference, integrated network management isn't just a technical issue.

Users have to contend with thorny political problems in moving to central site network management and justifying the purchase of expensive integrated net control tools.

Depending on the culture of a company, implementing central site control over a network could be a Herculean task. A company set on such a mission may face resistance from departmental groups or end users at remote sites who are loath to give up control of their portions of the net.

That's particularly true with many local-area network users who aren't anxious to give up their computing independence.

In addition, there's no easy way to quantify the benefits of implementing an integrated net-

work management system that could cost hundreds of thousands of dollars.

A network executive has to be able to show what downtime costs a company. That's no easy feat. Users have struggled for years to put a dollar value on diminished productivity and lost business opportunity.

Network managers also must be able to show how an integrated net management product will enable network administrators to be more proactive. They need to show how the tools will help administrators root out and resolve problems before they translate into costly downtime.

All of this highlights the fact that drafting a network management strategy involves more than just determining which integrated net management system can work with a particular set of products and services.

Users would be wise to take into account the needs and views of others in the company before

charting a course. By weighing other ideas, network managers may find that a distributed network management architecture would fit the company better. Or they may find that central site net management is the correct approach but that the network department has to do a better job of explaining why.

Working with other groups can go a long way toward making the net management project a successful one and avoiding turf wars that taint the credibility of network personnel.

Network executives also need to do a good deal of homework before selling the purchase of an integrated control system to senior executives. Providing hard dollar estimates of how the company will benefit, rather than generalizations, will aid in winning approval for the system. It will also increase end users' and upper management's understanding of the value of integrated net management. ■

OPINIONS

VENDOR SUPPORT SERVICES

BY RICK UTLEY

Certified NetWare Engineer — hitting a fast-moving target

It's 2:30 a.m.; my workday has just begun. I'm comfortably seated in front of my local-area network workstation.

My desk is buried in Novell, Inc. publications, NetWare manuals and an endless list of other related documentation just removed from my Novell attache case. A Novell porcelain coffee cup sits on my desk, full of piping hot coffee. I've got my Novell pen in hand. The new Novell note cube still bears its top sheet of paper, eagerly awaiting its first assignment.

In the last 14 months, I have covered more new ground and learned more new technical material than at any other time in my life. I truly believe that I have reached a point where I know more about Novell than I do about my own employer.

I am being required to learn more about Novell policy, Novell products and the Novell way of doing business than about any other single aspect of my daily job. I eat, drink, walk, talk and dream Novell.

Why? Because I'm training to become what Novell calls a Certified NetWare Engineer (CNE). I have attended classes, pored over computer-based training (CBT) programs, taken pretests, posttests and ghost-tests — not to mention, read everything I can get my hands on so that some day I'll be considered good enough to support the Novell user community.

I have worked my way from being a systems maintenance technician at IBM, through positions as a computer programmer, hardware/software design engineer, lead engineer supervising hardware and software projects, scientific programming analyst, scientific programming specialist — not to mention the various consulting I've done over the years — to my current position with complete responsibility for departmental LANs at one of the larger

Utley is a local-area network analyst with a large U.S. aerospace firm.

employers in the Silicon Valley.

I have experience with several Novell-based LAN systems. Today, my company has at least three up-and-running LANs that I personally have configured, set up, generated the operating system and workstation shells for, loaded applications on and performed all system administration tasks.

I have taken two classes for NetWare 2.15 System Manager. (The first wasn't Novell-certified. Heck, I didn't even know there was such a thing at the time.) I've also taken classes in Service and Support, Updates

I eat, drink, walk, talk and dream Novell. Why? I'm training to become a CNE.

▲▲▲

and Advanced Features, Introduction to Data Communications and Novell Enhanced Support Training.

I have completed the Supervisor CBT program at least twice, taken the pre- and post-System Manager tests included in the Service and Support CBT, and passed with 100% and 96% or 98%, respectively. I have busted my proverbial butt getting ready for the final exam, which I must pass to become a CNE.

Everyone I have met who has been exposed to Novell's various CNE course material, documentation, CBTs and final exams has agreed that ambiguities abound. In nearly all of the above areas, I have found conflicting information — in some cases, only pages apart in the same manual or CBT program.

The final exams, I am told, are drawn randomly from a pool of questions at the time the test is taken. The same test will probably never be duplicated. The test you take may be completely

different from that of all your fellow CNE candidates.

In addition, the final exams are administered on computer. You never receive a copy of the questions, nor are you told which questions you missed.

Maybe my next test will have been corrected before I take it; wouldn't that be nice?

My final score, after weeks of preparation, was 79%. A score of 85% or more is required to pass. No problem; for another \$70, I can take the test again. It won't be the same test anyway.

I have met what I consider some extremely sharp computer professionals in recent Novell classes who have failed the System Manager test more than once. The Introduction to Data Communications test has the most incredible reputation of all; I once talked to a Certified Novell Instructor who failed that test twice. Sources within Novell have reported a failure rate of better than 90% on that exam. What a marketing concept. Let's see, at \$70 a pop just to take the test, that's... wow!

And there's more good news. I have just received a letter from Novell, addressed "Dear CNEs and CNE candidates," which includes the following paragraph:

"New CNE candidates have six months to complete all core requirements and any new Continuing Certification requirements that may be added to the core requirements before CNE certification is granted."

When I got the letter, I had already completed all core requirements; however, one new Continuing Certification requirement was added. Oh well... it's only one more course and one more final exam to allow for — for *today*, at least. I had better get back to my studies; I've heard that tests for bridges, routers and gateways are now in the works. I better pass the exam before they become core requirements too.

What did I say CNE stood for? Clearly Never Ending? Nah!

I think it must stand for Clever Novell Entrepreneurs! **Z**

TELETOONS

BY FRANK AND TROISE



I must apologize! There's been a typo in our network manager's ad. It should say "eager young turks" not "jerks".

LETTERS

Token ring revisited

Your feature article, "16M vs. 4M token ring: Fourfold improvement?" (NW, Feb. 12) reached two conclusions with which I disagree.

First, the article states that "simply switching adapter cards will not lead to any perceptible improvements in performance." This conclusion is not backed up by the results of the study mentioned in the article. In fact, this study didn't even test that situation. The study tested the same adapter, the 4M/16M Token-Ring Adapter, at both 4M and 16M bit/sec data rates. It was not a card swap.

Most users considering upgrading to 16M bit/sec token-ring will be swapping their older 4M bit/sec token-ring cards with 16K bytes of random-access memory for the 4M/16M token-ring card with 64K bytes of RAM. This increase in RAM causes a significant performance improvement at either speed.

Second, the article states "network components, such as the operating system, application software, CPU, and server and workstation disk,

limit the end-to-end throughput, making the 16M bit/sec network only slightly more efficient than the 4M bit/sec network."

This statement is true, but two factors were omitted that should have been discussed in the review:

- The test used Novell, Inc.'s NetWare as the local-area network operating system. NetWare's token-ring drivers are known across the industry as being less than adequate for 16M bit/sec operation.

Novell publicly admits this and has pledged to improve its drivers. The current NetWare token-ring drivers did not implement early token release. By IBM's estimation, the highest throughput that can be achieved without early token release is about 10M

(continued on page 61)

Network World welcomes letters from its readers.

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Letters may be edited for space and clarity.

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Open sesame

Imagine if you could control access to your network with a pocket-sized computer. Or imagine if your users had keys to the network that could never be lost or stolen, and were as unique as their fingerprints. Both technologies are alive and well in today's networks in the form of smart cards and biometrics.

"Over 175,000 people in the U.S. currently carry some type of portable microprocessor-based possession to authenticate themselves in information networks, with about two-thirds of these [devices] being placed in service during the past 12 months," says Benjamin Miller, smart card and biometrics consultant, and publisher of "Personal Identification News," a monthly industry newsletter based in Washington, D.C.

Smart cards are hand-held devices with one or more integrated circuits that perform the functions of a microprocessor with memory capability. Smart cards usually include an I/O interface so that they can interact with a data base.

Purists argue that true smart cards must be the standard physical size of credit cards and must use reader devices for their information processing. But other de-

Casatelli is a freelance writer based in Washington, D.C.

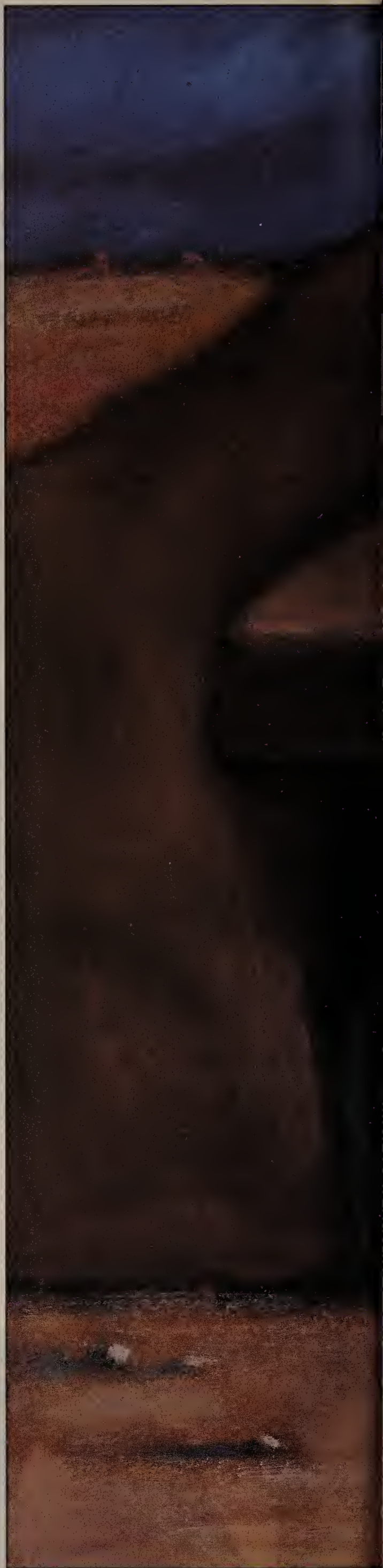
The market for up-and-coming network access technologies, such as smart cards and biometrics, may be poised for takeoff.

vices that fall into the smart card category take the form of tokens or keys, or may even resemble credit card-sized calculators that compute responses to encrypted challenges or come up with ever-changing algorithm-based codes, called dynamic passwords.

Halt: Who goes there?

Biometrics is an automated method of verifying or recognizing the identity of a person based on a physiological or behavioral
(continued on page 42)

By CHRISTINE CASATELLI





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characteristic. The user must introduce a particular trait several times to the biometric device to form a stored digital record, or template, in a process called enrollment. Biometric technology can be divided into six categories — hand scans, fingerprint verifi-



gerprint and hand scans, are physiological biometrics because they measure stable physical characteristics. Physiological techniques require larger, costlier devices but are judged to be more consistent than behavioral techniques — such as signature dynamics, voice verification and

The fingerprint's reputation as a unique identifier makes it a natural for biometrics.



cation, eye pattern scans, keystroke dynamics, voice verification and signature dynamics.

The idea of combining biology and automation is not new. In the early 1970s, the Identimat hand geometry system — marketed by Stellar Systems, Inc. — was used by Wall Street investor Shearson Hamil to measure finger length in a timekeeping application. However, the product was dropped by Stellar Systems in 1987.

Handscans, the oldest biometric technology, are used today primarily for physical access. The technology looks at both the top and side views of a person's hand using a built-in video camera.

The fingerprint's reputation as a unique identifier makes it a natural for biometrics. Machines that identify a single digitized fingerprint from a data base of thousands are much larger and more expensive than devices used only to verify that people are who they claim to be.

The first involves finding one fingerprint in a huge data base of fingerprints; the other involves making sure the fingerprint of the person putting their finger in the device is the same as the print on the smart card, as opposed to the data base blindly trying to figure out who the person is. The latter verification technique requires smaller digital records and can take place in the software or plug-in hardware of a personal computer.

Eye pattern biometrics use low-intensity infrared light to scan an individual's retina, or the back part of the eye, which has a unique series of blood vessels. Eye patterns encounter the most user resistance because the technology requires that a beam of light be shined through a user's pupil. However, companies such as Eye-D of Fairfield, Conn., are working on developing an eye biometric device that saves users from the infrared beam by examining the iris, located on the eye's surface, instead.

Eye patterns, along with fin-

keystroke dynamics — which can vary depending on a user's emotional state.

Also called typing rhythms, keystroke dynamics lends itself most naturally to computer and network access. The technology uses software that analyzes the way a user types a word or phrase and matches it to a stored version. No commercial product is currently available, however, because developers are still struggling with how to overcome differences in keyboard construction.

Some major companies, such as AT&T, have developed voice-verification algorithms, and a number of smaller companies have introduced products for computer and network control. Voice verification can be split into two basic approaches: through dedicated hardware and software at the point of access or via a dial-up link to a personal computer host.

“Low-cost voice and signature systems appear to be best situated for growth.”



The devices focus on the voice's frequency spectrum according to time intervals and not on aspects such as inflection that potential intruders might try to imitate. Thus the technology is not easily fooled by impersonators.

Because signatures are ubiquitous in the banking industry, signature dynamics seem to have found a home in securing financial transactions over data networks. There are more than 100 patents and several products in the signature dynamics market. Approaches to the technology are diverse, and each product takes a different perspective on how in-

dividuals sign their names.

On biometrics, Miller says, “Low-cost voice and signature systems appear to be best situated for growth. Fingerprint and keystroke dynamics devices designed for computer security need to establish reliability before significant sales will develop.”

IBM hopped on the biometrics bandwagon late last year by introducing a network security product that uses signature dynamics. The company had tested the technology at the Federal Reserve Bank of New York.

Big Blue's new product, called Transaction Security System (TSS), includes several network security modules, 8K-byte personal security cards with electrically erasable programmable read-only memory and a dynamic signature pen.

TSS can encode and decode information at the host computer. It uses message authentication based on the Data Encryption Standard and runs on IBM Personal Computers and Personal System/2s.

IBM has been working on signature dynamics technology since the early 1980s at its Thomas J. Watson Research Laboratory in Yorktown Heights, N.Y., according to William Rohland, IBM systems security business manager. The pen does not require a sensitized tablet and is rotationally independent, which means that a user can grip it in any position and it will still work.

To develop a template, users write their signatures five times with the sensitized pen, which picks up pressure patterns and horizontal and vertical acceleration and stores it on the smart card. The user's signature must match the template within the designated acceptance threshold determined by the user's employer. If it does not, the system de-

nies access and signals an attempted breach of security.

Although the two often complement each other in information security, smart cards are leading biometrics in actual network applications. Cards with microprocessors can significantly improve upon fixed passwords, but for users who must keep the wrong people out of the network, biometrics is the only way to go. And for those looking to keep their security a step ahead of their evolving networks, biometric technology is inevitable in the progression.

Just five years ago, security departments of Fortune 500 com-

panies introduced the concept of passwords to their business units, which were not interested in the idea because it made getting into the system cumbersome and inconvenient, according to Miller. Networks grew at a such a staggering pace in the three to four years that followed, marketing and customer service departments reexamined the technology.

“Those same business units that rejected tokens are now asking for them to offset the risks associated with new services,” Miller says.

Protecting far-flung networks has prompted communications managers to explore smart cards and biometric technologies more aggressively to attract customers. Roger Fox, information security manager at the Bank of New England in Boston, says that fixed passwords and even dial-back features are not sufficient to keep clever intruders out of today's sophisticated networks.

“Our feeling about dial-back is that it's passe at this point,” Fox says. “With call forwarding, you

IBM has been working on signature dynamics technology since the early 1980s.



really don't know who you're talking to.”

Bank of New England uses smart cards that resemble pocket calculators with a seven-digit display. “This particular device is [battery]-powered and works on a challenge-response [basis],” Fox says. “You don't need any reader device.”

With the help of the smart card, a bank customer can access a number of financial services from a remote terminal with communications software.

“We use the smart cards to verify someone's identity before allowing them to set up their own letter of credit on-line so they don't have to talk to a clerk,” says Fox, adding that the application is best for infrequent transactions worth hundreds of thousands of dollars.

The customer dials into the bank's computer center and encounters authentication software residing in the data switch. “The application works with a private branch exchange,” Fox explains. Once the software verifies the customer's identity at the remote terminal, it asks for the appropriate password. Customers must first identify themselves to the PBX with a personal identification number and then use their card to respond to the prompt.

A correct response gives the customers access to the bank's computer and allows them to enter the information necessary for

establishing a letter of credit, thereby accelerating the process.

“All we're asking you to do is to tell us what the encrypted number is,” Fox says. “If you know what that number is, then we know that you are in fact in possession of that device.” After positive verification, a menu pops up on the screen, giving that customer access to the equipment.

“Ordinarily, you dial a particular number to a particular platform, and it's all automatic at that point,” Fox says. The menu feature gives customers the ability to access a number of services, he says.

“The marketing department drove it,” says Fox, adding that the bank was trying to sell letter-of-credit systems to clients, and the more sophisticated companies wanted a high degree of security. “We've had positive feedback so far.”

Bob Kulin, security architect for the Royal Bank of Canada, says his organization has been using smart cards for network security for five or six years. “As far as

quantitative results, it's hard to say what kind of effect smart cards have had,” says Kulin, adding that the bank's real payoff is in better security perception and an increased competitive edge.

As a longtime user of smart cards, the Canadian bank has blazed a trail for other financial institutions and plans to continue the innovation. “We've seen the proliferation of smart cards for network security,” Kulin says. “And for a number of reasons, biometrics is the next logical step.”

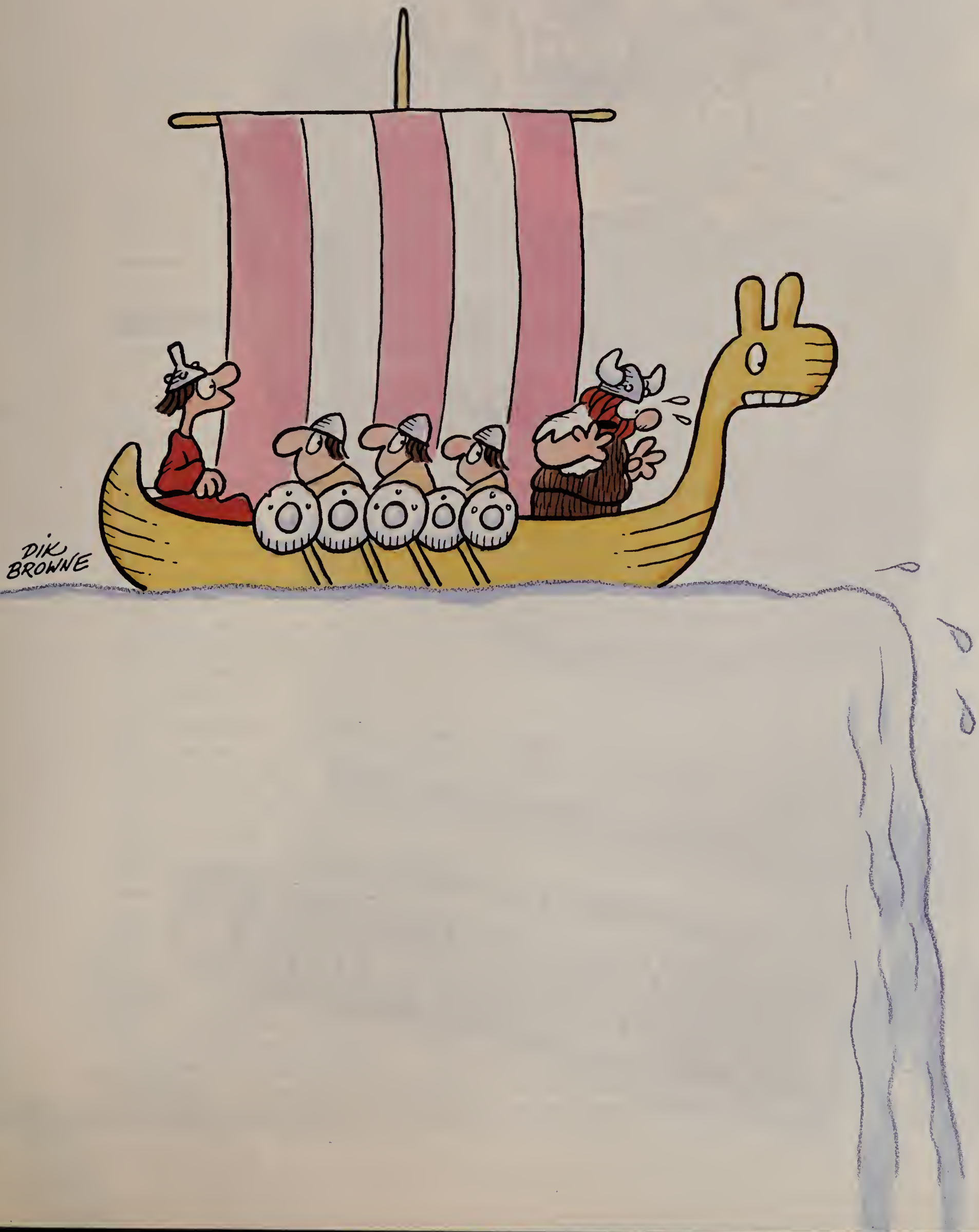
A growing market

The market for products that supply access to information via smart cards and biometrics may be small, but it is growing at an average annual rate of about 12%, according to Randy Perry, senior consultant at Joseph Schneider Associates, a management consulting firm in Cambridge, Mass.

Perry says that though card applications now dominate applications in network security, biometrics is on the verge of a commercial explosion in the market. “Biometrics could grow phenomenally, but it's difficult to predict when exactly that will happen,” he says.

“The biometric industry has experienced its greatest rate of growth in 1989, with the number of unit shipments rising by 167% (continued on page 60)

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See The FAXNet Form on Page #67



Big returns on small investments

CONTINUED FROM PAGE 1

Server performance is determined primarily by the network driver software, the network interface card or adapter card and the combination of subsystems — the CPU and disk drive, for example — that make up the server itself.

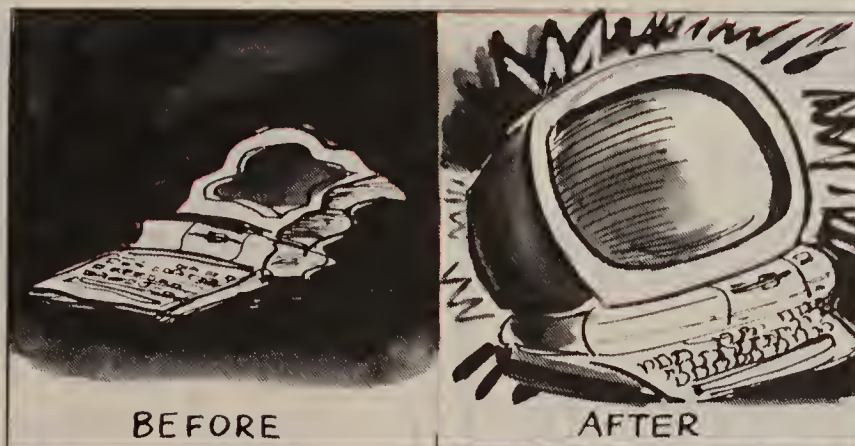
Driving performance

"Network drivers are the primary bottleneck to server throughput today," says Colin Mick, vice-president and general manager for the services division of LanQuest. Drivers determine how network interface card resources are used to pass data to and from the network.

"The bad news is that progress in driver design has lagged behind hardware design and many drivers available today follow obsolete rules and concepts," Mick says. "The good news is that net-

Salamone is the features writer for Network World.

Impressive gains in network performance don't have to be expensive.



work interface card and network operating system companies are starting to pay more attention to

drivers, and I expect that we will see significant improvements this year."

With today's drivers, the areas to consider if you want to improve performance are the data frame size, the use of buffers, the use of list management in token-ring networks and duplication of protocols.

"Data frame size is an important factor," says Gary Nichols, senior LAN test technician at LanQuest.

Increasing data frame size

Every packet of information traveling on the network consists of management information and data.

The management information adds a fixed amount of overhead per packet. The impact of this overhead on network performance can be reduced by increasing the size of the data frame in the packet and thus increasing the ratio of data to management information in a packet.

However, Nichols warns that increasing the data frame size can

(continued on page 57)

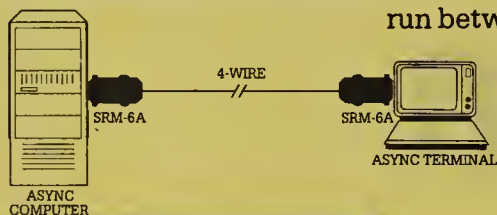
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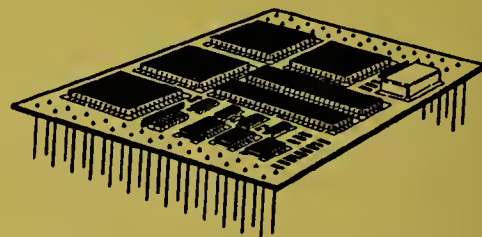
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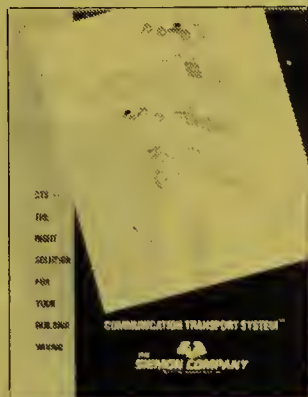
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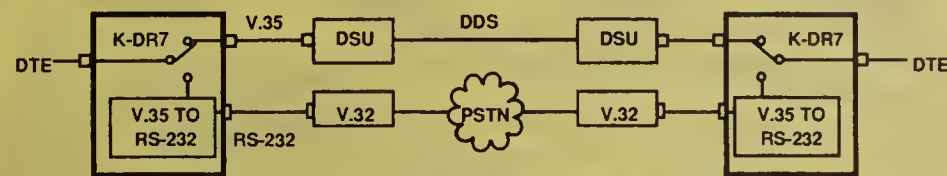
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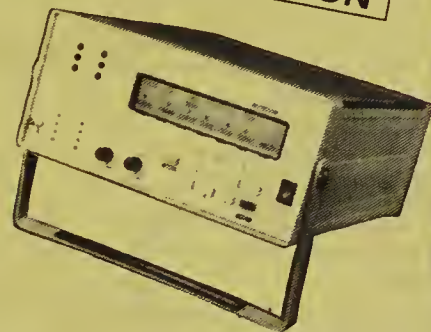
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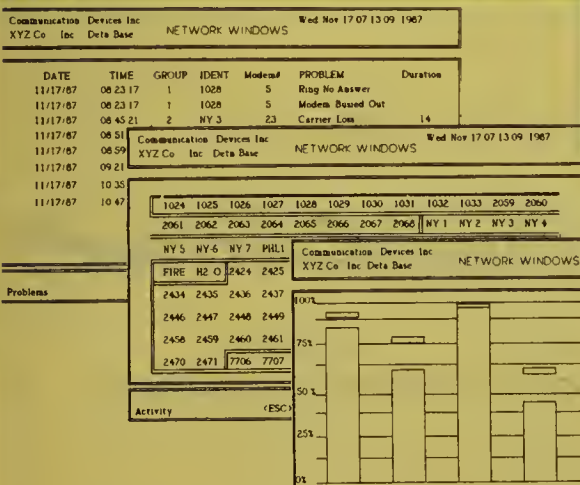
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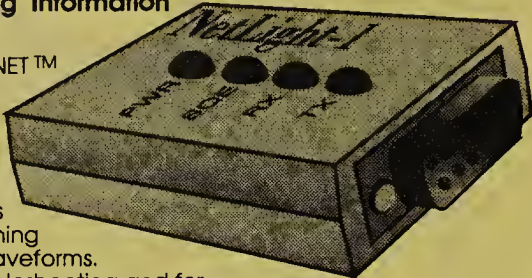
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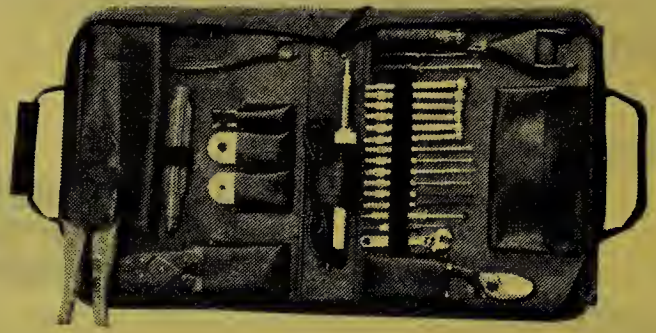
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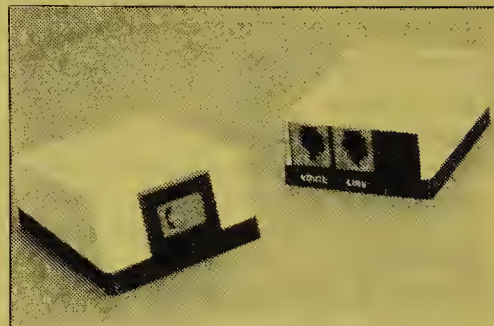
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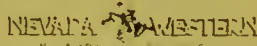
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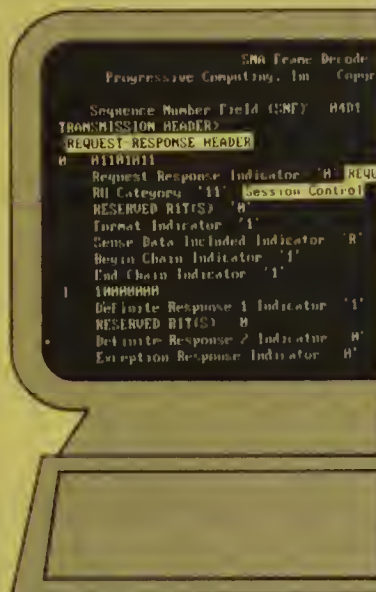
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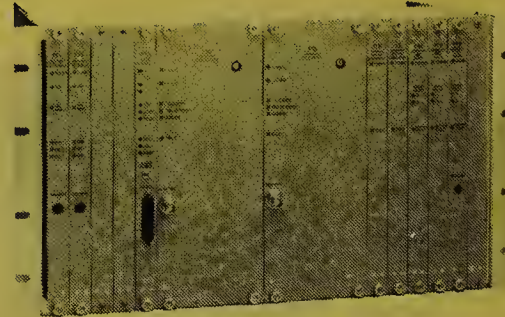
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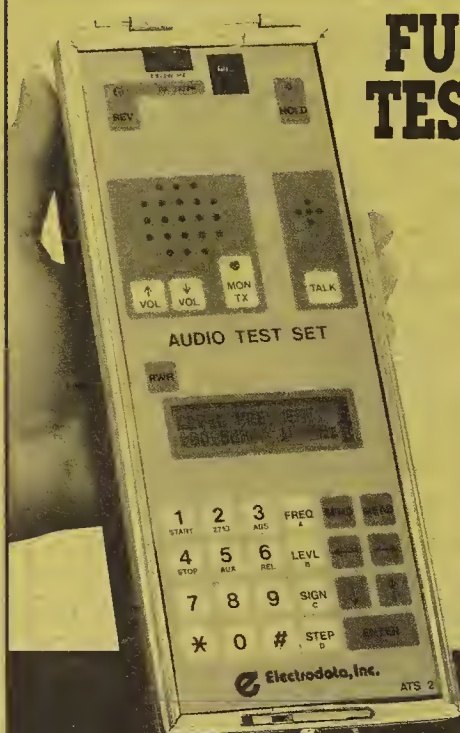
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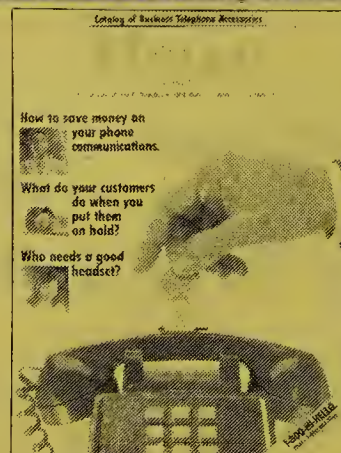
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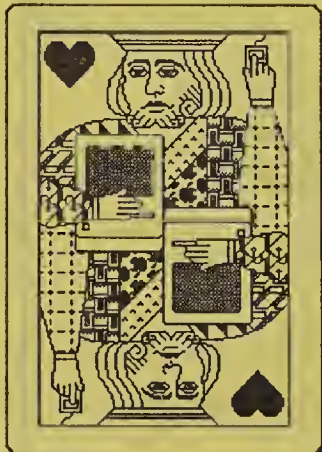
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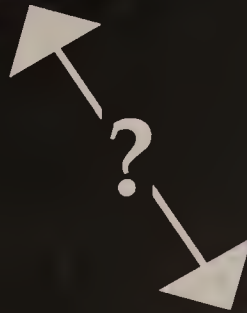
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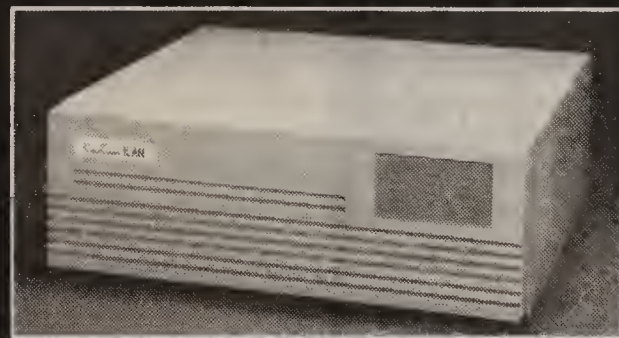
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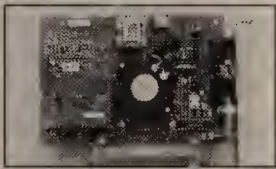
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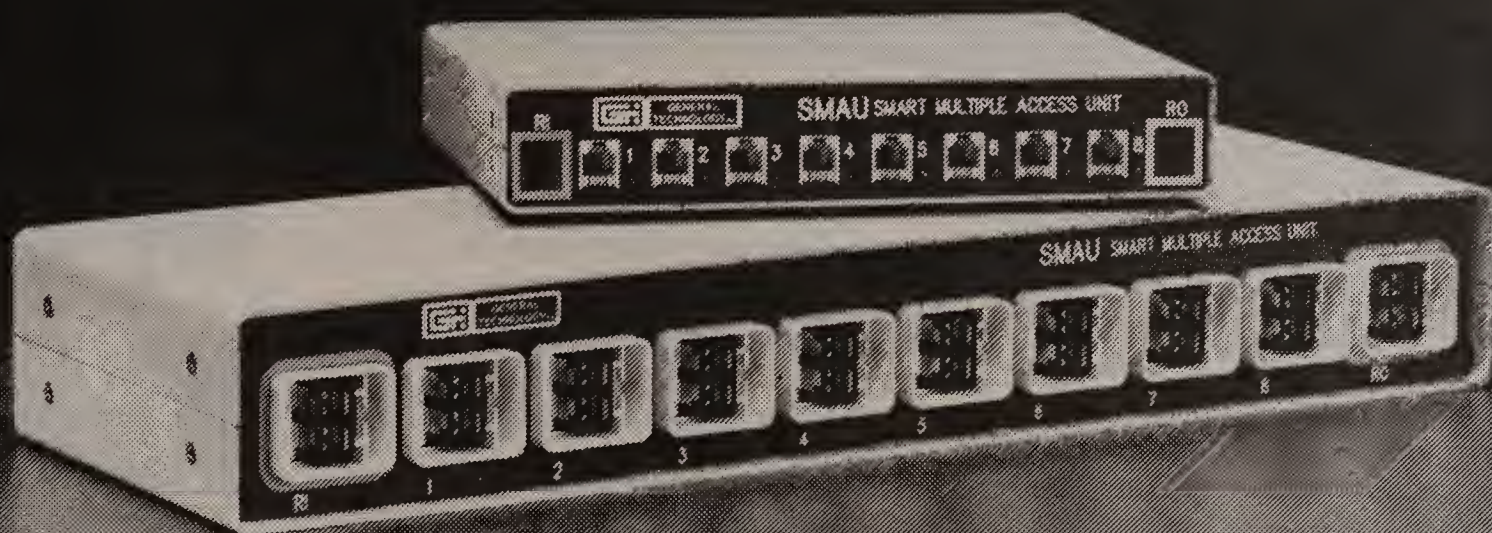
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(continued from page 47)

be a double-edged sword. It only brings benefits if the data frames can be filled — that is, if the network operating system or application program supplies the data to the network interface card in blocks equal to or greater than the size of the data frame.

If the application or the network operating system supplies data to the network interface card in very small blocks, the full data carrying capacity of the data frame is not used and the advantage of the larger frame size is lost.

Driver performance

Driver performance is severely restricted because most drivers limit token-ring cards to 1K-byte blocks, which is not bad for Ethernet — where the maximum block size is 1.5K bytes — but grossly underutilizes the data carrying capacity of a token-ring network. Token-ring technology allows larger data frames to be sent between workstations and servers: 4K bytes for 4M bit/sec LANs and 18K bytes for 16M bit/sec LANs.

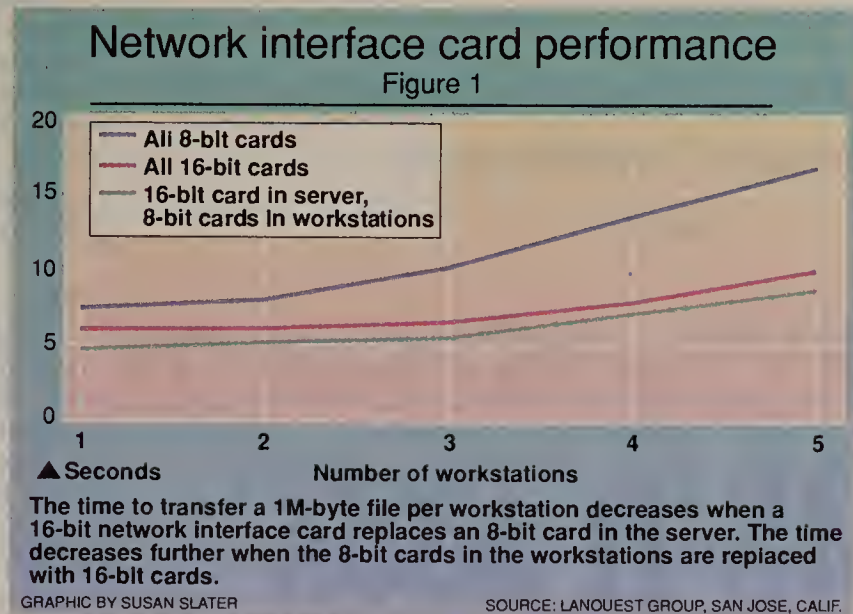
The 1K-byte limit of today's token-ring drivers appears to be maintained more out of inertia than anything else. The people writing the software for the token-ring drivers probably just didn't get around to changing that part of the Ethernet driver software, according to Mick.

A LanQuest program, called Trans, was used to send data from the server buffer to the workstations without accessing the server disk. During the test, each of three application programs — Microsoft Corp.'s Microsoft Word, Lotus Development Corp.'s 1-2-3 and Ashton-Tate Corp.'s dBase — were run using the Trans program to start the

and 4K bytes.

The test found that using larger blocks did, in some cases, improve network performance when using the same server, network interface cards and workstations (see Figure 3).

of these design variables is masked by the relatively low sophistication of today's device drivers, according to Mick. "Given the current state of driver technology, bus size is probably the only variable that is a signifi-



With Novell's NetWare as the network operating system, the size of the frame transmitted by the server is determined by the size of the frame the workstation can accept.

Although this test focuses on servers, it is important to understand that the workstation's network interface card drivers must be set to use a larger frame size in order to realize the benefits of a larger data frame size at the server, Mick says.

The point is that even if the server uses an advanced network interface card with a sophisticated driver, you may not realize the full potential throughput because the size of the packet sent depends on the receiving station, not the server. This was borne out by the test results, in which the larger, 4K-byte block size improved performance only when

cant factor today," he says. "However, the other factors will become more important this year as device drivers become more sophisticated."

"We ran a number of tests comparing the performance of eight-bit and 16-bit network interface cards," says Charles Hanes, vice-president for technology and planning at LanQuest.

The tests determined the time required to transfer 1M byte of data from the server to as many as five workstations. Trans isolated the network interface card by loading all of the data into the server cache prior to transmission. Thus, there was no disk access while the test was running.

The test was run with three network interface card configurations. In the first configuration, the server and all of the workstations used eight-bit network interface cards. The time to transfer a 1M-byte file to each workstation varied from 7.38 seconds in the run with one workstation to 16.63 seconds when five workstations were connected to the LAN.

It takes longer to send 1M byte of data to five stations than it takes to send 5M bytes of data to one station. This is because the server is attending to more workstation requests, it is sending more packets and there are five times as many acknowledgments on the network.

In the second configuration, the network interface cards in the workstations used eight-bit network interface cards and the server used a 16-bit network interface card. This switch of a single network interface card decreased the amount of time needed to transfer the 1M-byte file by nearly 20% in the case with one workstation, from 7.38 seconds to 5.98 seconds.

A larger improvement was observed in the five-station configuration, where the time needed to transfer 1M byte per workstation decreased by more than 40%, from 16.63 to 9.94 seconds.

In the final setup, 16-bit network interface cards were placed not only in the server, as in the previous test run, but also in all of the workstations. Here again, there was an overall performance gain, but it was smaller than in the previous test (see Figure 1).

In the one-station run, the time to transfer a 1M-byte file improved by 30% — down to 4.73 seconds vs. 5.98 seconds in the previous setup and 7.38 seconds in the configuration with eight-bit cards only.

Similarly, in the LAN setup with five workstations, the time per workstation to transfer 1M byte of data was reduced to 8.62 seconds in the configuration that used only 16-bit cards.

That was about 13% faster than the 9.94 seconds measured in the configuration with eight-bit network interface cards in workstations and a 16-bit network interface card in the server. And it was approximately 48% faster than the 16.63 seconds recorded in the configuration with all eight-bit cards.

"The test results show that the most significant gain in performance comes by putting a 16-bit

ysis at LanQuest. That is not easy to do since the design of most drivers is still lagging here.

"I think the effective use of buffers will be a key to realizing the performance potential of 16M bit/sec token-ring cards, so we should see progress in this area soon," McGiffert says.

Still, there are additional ways to improve performance through network interface cards. "There are several techniques that are used to move data through the network interface card and the server's RAM," Mick says. "One technique, bus mastering, seems to offer very good throughput. And we have been seeing increased interest in bus mastering designs lately."

Maximizing throughput

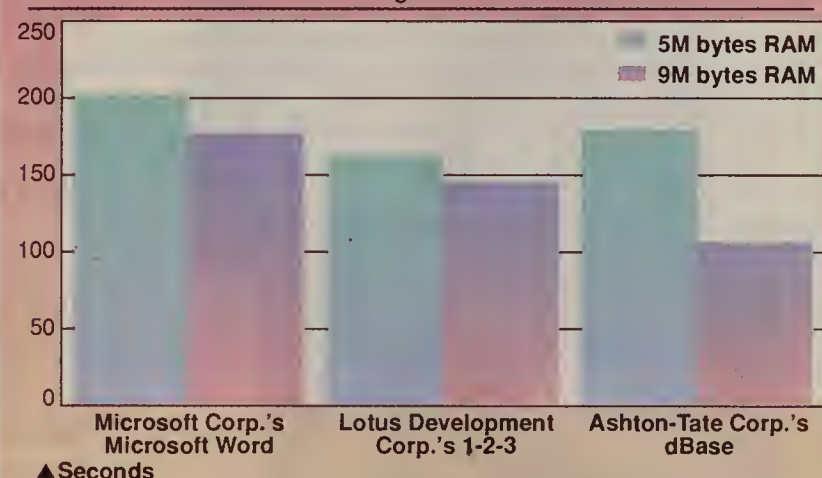
To maximize throughput between the server and the network, the server must be able to keep up with the network's demand for information. "This is seldom the case," Mick says.

"I think it's fair to say that in many of our tests, it is the server that is the biggest performance bottleneck," he says.

Using Trans in application-

Impact of server memory on performance

Figure 2



network interface card in the server and increasing the number of workstations," Mick says.

"We're just starting to test 32-bit network interface cards, and my guess is that we'll see as much improvement in performance switching from 16-bit to 32-bit network interface cards as we've seen between eight- and 16-bit network interface cards," he says. "If you have an 80386-based server and an open slot in the workstation for a 32-bit card, this is one change that could give you a big performance payoff."

Bolstering RAM buffers

Besides switching to a 16-bit network interface card, another way to improve network performance is by increasing RAM buffers on the network interface cards. This is particularly true with token-ring networks.

The catch is that the network driver has to be configured to take advantage of these buffers, according to Brian McGiffert, manager of LAN testing and anal-

based tests, data was first loaded into the server cache so that the server's disk was not needed while running the tests.

With this test, it is common to see the server utilization at 100%. However, the network, whether token ring or Ethernet, is still not running at full capacity. To overload the net would require multiple servers and a large number of workstations. "Still, whenever there was a call to a disk for information, performance dropped," Mick explains.

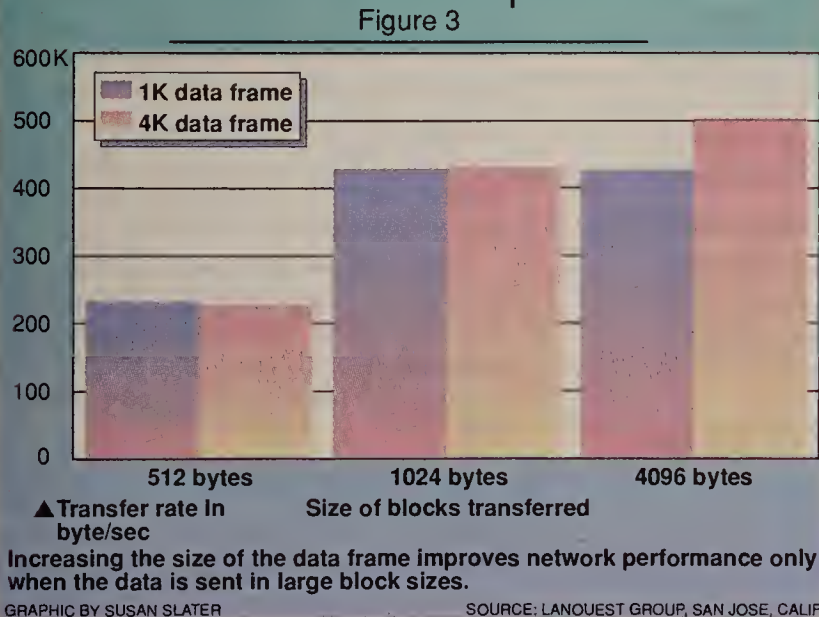
"In tests such as this one, we often see an interaction between frame size at the network interface card and the way operating systems partition data on the disk drive," Mick says. "In NetWare, for example, we maximize throughput on our Trans test, which doesn't use the disk drive, by maximizing the frame size."

In test runs that utilize the disk, large frame sizes tend to decrease performance because NetWare partitions the disk in 512-

(continued on page 58)

Frame driver comparison

Figure 3



program, open a work file, move through the file, close the work file and exit the program. This set of operations was repeated 50 times for each program.

In this test, 6M bytes of data were sent to combinations of three, six, nine and 12 workstations. For each configuration, three different test runs were performed. For each run, the test data was sent in blocks of 512, 1K

data was sent in large chunks of 4,096 bytes.

Performance is in the cards

Several network interface card design variables influence performance in the server. The key variables include bus size, data transfer method, on-board intelligence and on-board RAM buffers.

Currently, much of the impact

(continued from page 57)

byte chunks, he adds. A data frame size larger than this lowers throughput because there is a delay waiting for additional data to be retrieved from the disk before a frame can be transmitted.

Another component of the server affecting throughput is the amount of RAM. "Adding RAM to the server is generally a good investment," McGiffert says, "particularly with the rapidly declining RAM prices we're seeing today."

To quantify the benefits gained by adding RAM to the server, a separate test was conducted. This test used 12 workstations and Advanced NetWare 2.15 as the operating system.

The test ran the application programs — Microsoft Word, 1-2-3 and dBase — to

generate the network traffic load.

Each application was started, a file was opened and closed, and then the application was closed. This process was repeated 50 times, as fast as each workstation could

In the Microsoft Word test, for example, one workstation generated network traffic equivalent to between five and 10 people simultaneously using Microsoft Word on the network.

“Adding RAM to the server is generally a good investment,” McGiffert says.

▲▲▲

execute the commands, which generates quite a bit of traffic on the network.

The test found that calling a program 50 times took less time when the server

had more RAM (see Figure 2, page 57). For example, when using Microsoft Word, the run with 5M bytes of RAM in the server took 201.3 seconds to complete. This improved by about 12.5%, to 176.33 seconds, when the server had 9M bytes of RAM.

Similarly for 1-2-3, the time improved from 162.2 seconds for the run with 5M bytes of RAM in the server to 144.4 seconds for the run with 9M bytes of server RAM. The biggest performance gain came in the dBase run, during which the time dropped 41%, from 178.2 seconds to 105.33 seconds.

What's the best bet?

The test results indicate that network performance can be improved significantly by making several relatively inexpensive upgrades to existing LAN equipment.

First, eight-bit network interface cards in the server should be upgraded to a 16-bit design. In addition, the network interface card in the server should be as sophisticated as possible. According to Mick, that means the card should use some of the newer data-transfer techniques such as bus mastering.

Second, the server's RAM should be increased. The current network operating systems require plenty of RAM. At today's prices, adding RAM to a server is an inexpensive performance booster.

The network interface card driver is the biggest barrier to network throughput.

▲▲▲

Third, the server's disk drive system should be upgraded.

"We haven't done any tests formally comparing disk drive subsystems, but it's safe to assume that faster access time and higher transfer rates will improve performance," Nichols says. Most new servers today come with Enhanced Small Device Interface (ESDI) or Small Computer System Interface (SCSI) controllers that have much greater transfer rates than drives that are a couple of years old.

If your applications are disk-intensive and you're using an older ST505-type hard disk, upgrading to a newer, high-performance hard drive subsystem could really breathe new life into your server, Nichols says.

"We are also seeing increased use of more sophisticated drive management techniques, such as elevator seeking, that take advantage of the greater flexibility and local intelligence of ESDI and SCSI drives," LanQuest's Hanes says. "The new high-end servers, such as the Compaq [Computer Corp.] SystemPro and the Net-Frame [Systems, Inc. NF-series server], have some very elegant drive management techniques."

Finally, the network interface card driver is the biggest barrier to network throughput.

According to Mick, "You should check with network interface card and network operating system vendors to ensure that you have the most up-to-date driver." □

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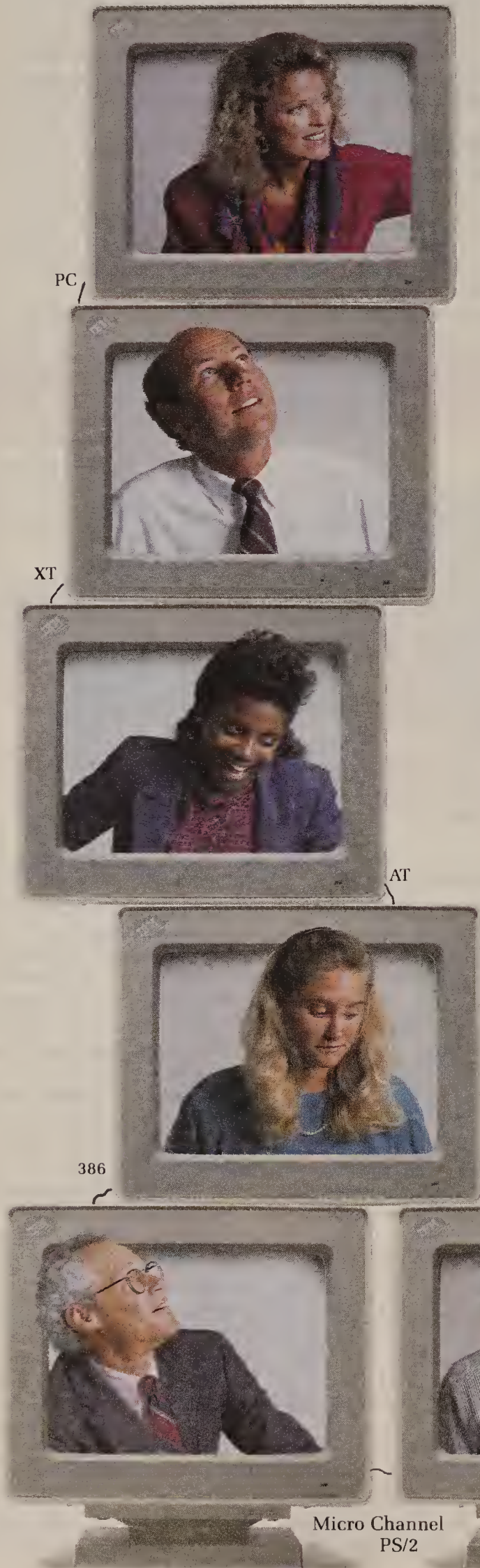
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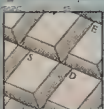

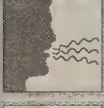


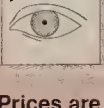
(continued from page 42)

and sales increasing 90%," Miller says.

Despite the industry's headway, Miller says that general biometric technologies suffer from

pected over the next 12 to 18 months. But he added that some reductions will materialize as biometrics are integrated into systems. By 1991 and 1992, he predicts, a new class of inexpensive

Biometric product prices

	1981	1985	1989	1990
 Keystroke dynamics	—	\$1,000	\$800	\$800
 Signature dynamics	\$2,200	\$1,500	\$1,000	\$900
 Voice verification	\$15,000	\$3,500	\$1,200	\$950
 Fingerprint scans	\$12,000	\$7,500	\$3,900	\$1,500
 Hand scans	\$10,000	\$7,500	\$3,500	\$3,000
 Eye scans	—	\$7,500	\$7,500	\$5,000

Prices are based on the number of access points each product protects.

GRAPHIC BY SUSAN SLATER

SOURCE: PERSONAL IDENTIFICATION NEWS, WASHINGTON, D.C.

poor visibility in network security because their developers lack sufficient distribution channels. IBM's entry into the market may help to boost sales by adding momentum to the market and credence to the techniques. "The sheer size of the banking industry, which IBM has targeted, could account for several thou-

sand unit sales in 1990," Miller says.

devices will emerge for mass identification applications, making biometric technologies reasonable and realistic alternatives for network security.

At Rockwell International Corp. in Pittsburgh, 1,500 employees access eight corporate systems using dynamic password smart cards, which constantly

The whole process takes about 15 to 20 seconds, according to Roy Alzua, program manager for telecommunications security at Rockwell in Seal Beach, Calif. The card contains its own microprocessor, power supply and synchronized clock, Alzua says. "The employee is the interface," he adds.

Rockwell has been using smart cards for network security for about 2½ years. According to Alzua, the biggest obstacle in the beginning was not the technology but upper management.

"We were very interested in using dynamic passwords to authenticate users on the mainframe," Alzua says, "but our biggest problem was the cost of the card." At \$50 a pop for 1,500 users, "we had to convince management that it was a good investment."

Alzua says a Rockwell study determined that it would eventually cost the company \$17 per month per employee for the smart cards. Technologies such as dial-back features and secure modems were judged to be less convenient and less secure. The study also estimated that those technologies would be more expensive: Each computer would need its own secure modem, and dial-back features would escalate telephone access charges.

Rockwell's next step is to use super-smart cards — with their own erasable programmable read-only memory (EPROM), random-access memory, read-only memory and CPU — to encrypt communications, especially over LANs. The objective is to encode data from the workstation over LANs through gateways, past the wide-area network and finally to the host, Alzua says.

"This type of application is the most feasible approach to solving the end-to-end encryption problem," he says. Alzua adds that he would like to see the use of a biometric technique — such as fingerprint scans — to make the network even more secure, "but we're not quite there yet."

A new twist

Taking a different tack on voice verification over networks

systems.

The Voice Check Director is an automated attendant, voice mail speech-verification device that verifies calls to a fax machine. "All we're doing is intercepting the call before it gets to the fax and verifying it first," Bigelow says. "Now, instead of taking the word of the caller, the caller's identity is verified."

In the fax application, the call is intercepted at the PBX and is directed to the biometric device. If the voice is successfully verified, the remote user would be

magnetic strips are prevalent in the retail industry, smart cards have yet to catch on. Surprisingly, though, biometrics may gain the support it needs to blossom among retailers that need a more reliable way to authenticate their credit customers.

The retail industry is testing the biometric waters right now, Miller says. A New York retailer, which asked that its name not be disclosed, is experimenting with the concept of replacing credit cards with an identification system based on customers' scanned

Lack of "user acceptance is an overemphasized excuse."



told to hold the line while the PBX routes the call to the fax machine. The user hangs up the phone after hearing the fax tone, and the transmission begins.

The automated attendant product would be used as a voice mail system but would verify an individual's voice before the call was transferred elsewhere. According to Bigelow, beta-testing for the Voice Check Director will begin in April and last for three to six months. A minimum configuration would likely cost close to \$25,000.

The National Security Agency (NSA) has taken the lead with its government-sponsored generic project called Low-Cost Encryption Access Device (LEAD). The device uses standardized 16K-bit electrically EPROM smart cards to authenticate users and to encrypt and decode information over the Defense Data Network for about \$200 per system.

The NSA has selected three hardware vendors and three card vendors to develop the system, which is said to protect sensitive, but unclassified, data transmissions.

LEAD supports data transmission speeds of up to 9.6K bit/sec using computer terminals with

fingerprints. The fundamental idea behind the project, which was launched in September 1989, is to transmit the customer's digital fingerprint electronically over a network to a remote location where it is verified and matched to an account number.

A smart card credit card may not be possible until 1995, if at all, according to a research study commissioned by Visa USA, Inc. in 1987. Written by Payment Systems, Inc., a Tampa, Fla.-based research and development organization, the study says "chip cards will be cost-justified within a seven-year time frame based on increases in telecommunications costs and other costs of credit card transactions."

The major obstacles in using smart cards in the retail industry are the loss of merchant's control over authorization and concerns for consumer acceptance, the study says.

Since most retailers don't want to be the first to try commercially unproven biometric techniques, many are staying away from the technologies. The study says, however, that the appeal may be too strong to resist, noting, "The potential reduction in credit losses, along with increased market share, may be the catalyst for introduction."

Perry of Joseph Schneider Associates says people are more flexible than they are given credit for when it comes to smart cards and biometrics. Lack of "user acceptance is an overemphasized excuse for why the market hasn't done better," he says. "I really don't think very good marketing has been done."

Perry agrees, though, that there is one aspect of network access technologies that may hold them back if developers are slow to address it: "In retail, convenience is a key buying factor," he says. "User acceptance is more of a critical issue when you talk about how long it takes to use a device." ■

General biometric technologies suffer from poor visibility in network security.



sand unit sales in 1990," Miller says.

"The one group working diligently on biometrics in information security applications is systems integrators, which are investigating the technology for medical systems, government computers and electronic funds transfer," Miller says.

Improving the ability to integrate the devices will also help biometrics take off, Perry says. "In many cases, the devices are still stand-alone," he notes. "You have to be able to integrate with other access-control devices."

Perry adds that a reduction in prices might be what the industry needs to start the deluge. "The biometrics industry needs to get its products down to a price range that would be competitive with other access-control systems," he says. "It hasn't done that yet, although prices have gone down quite a bit in the last few years" (see graphic).

According to Miller, major price reductions should not be ex-

generate new passwords.

For example, a Rockwell engineer responding to a trouble call at a customer site might need to access the corporate network. Using a standard personal computer with communications software and a modem, the engineer dials into a corporate data line. After inputting his user ID, the engineer sees a prompt on the screen from the corporate network authentication software calling for the correct password.

Rockwell's smart card, which is synchronized with the software on 30-sec intervals, yields the appropriate password on its display. The engineer types in the password and the server on the company's data switch authenticates the engineer's identity for access to the data base. If the passwords match, the engineer receives a menu of authorized selections — such as a particular local-area network, IBM machine or DECnet. The selection is sent to the data switch, which authorizes a communications port.

A reduction in prices might be what the industry needs to start the deluge.



is Voice Check, Inc., a start-up, biometric company located in Converse, Texas. Bill Bigelow, Voice Check president, is developing a new twist to securing communications by using an IBM Personal Computer AT and a Texas Instruments, Inc. speech board to adapt voice verification to facsimile machines and voice mail

single-port devices to gain access to the host computer, according to sources at the agency. The networked host system must have a multiport device with an encrypted list of users. As many as 1.5 million cards will be issued to protect 100,000 LEAD terminals, sources say.

Although credit cards with

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1 Industry: (check one only)

- 01. ☐ Manufacturers (other than computer/communications)
- 02. ☐ Finance/Banking
- 03. ☐ Insurance
- 04. ☐ Real Estate
- 05. ☐ Healthcare Services
- 06. ☐ Legal
- 07. ☐ Hospitality
- 08. ☐ Retail/Wholesale Trade
- 09. ☐ Transportation
- 10. ☐ Utilities
- 11. ☐ Education
- 12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
- 13. ☐ Government State/Local
- 14. ☐ Government Federal
- 15. ☐ Military
- 16. ☐ Aerospace
- 17. ☐ Consultants (independent)
- 18. ☐ Carriers
- 19. ☐ Interconnects
- 20. ☐ Manufacturers (Computer/Communications)
- 21. ☐ VAR/VAD/Systems House
- 22. ☐ Distributor, Computer Related
- 23. ☐ Distributor, Communications Related
- 24. ☐ Other

2 Job function: (check one only)

- 1. ☐ Networking Management (Responsible for both voice & data)
- 2. ☐ MIS Management (VP, Dir., Department Head)
- 3. ☐ Corporate Management (Chairman, President, Owner, General Manager, CEO, CIO, VP)
- 4. ☐ Data Communications Management (Responsible for data only)
- 5. ☐ Telecommunications Management (Responsible for voice only)
- 6. ☐ Financial Management
- 7. ☐ Engineering Management
- 8. ☐ Consultant (Independent)
- 9. ☐ Other

3 What is the scope of your involvement in purchase decisions for Network/Communications products + services? (check one only)

- 1. ☐ Enterprise Wide (Organization/Subsidiary/Division)
- 2. ☐ Multi Enterprise (Consultants)
- 3. ☐ Department Wide

4 What is the total number of sites for which you have purchase influence?

- 1. ☐ 100+
- 2. ☐ 50-99
- 3. ☐ 20-49
- 4. ☐ 10-19
- 5. ☐ 2-9
- 6. ☐ 1

5 Your primary responsibility: (check one only)

- 1. ☐ Both Data + Voice
- 2. ☐ Data Networking Only
- 3. ☐ Voice Networking Only
- 4. ☐ None

6 Which transmission media do you use in your network: (check all that apply)

- Public:
- 01. ☐ Switched-Based (DDD, Wats, Megacom, etc.)
- 02. ☐ Leased Line (not including T-1)
- 03. ☐ T-1
- 04. ☐ Fractional T-1
- 05. ☐ T-3/SONET
- 06. ☐ Broadband
- 07. ☐ ISDN
- Private:
- 08. ☐ Satellite
- 09. ☐ Microwave
- 10. ☐ Fiber Optic

7 Is your network: (check all that apply)

- LOCAL AREA NETWORK
- 1. ☐ Local (within building)
- 2. ☐ Local (in a campus environment)
- WIDE AREA NETWORKS
- 3. ☐ International
- 4. ☐ National
- 5. ☐ Regional (several states)
- 6. ☐ Metropolitan

8 What is your network architecture? (check all that apply)

- 1. ☐ SNA
- 2. ☐ DECNET
- 3. ☐ OSI
- 4. ☐ GOSIP
- 5. ☐ MAP/TOP
- 6. ☐ TCP/IP
- 7. ☐ DCA (UNISYS)
- 8. ☐ OTHER

9 What is your LAN Operating System? (check all that apply)

- 01. ☐ 3COM (3+, 3+open)
- 02. ☐ LOCAL TALK (APPLETALK)
- 03. ☐ BANYAN (VINES)
- 04. ☐ DCA (IRMALAN)
- 05. ☐ IBM (LAN Server)
- 06. ☐ IBM (PC LAN PROGRAM)
- 07. ☐ MICROSOFT (LAN MANAGER)
- 08. ☐ UNGERMAN BASS (NET/1)
- 09. ☐ NOVELL (NETWARE)
- 10. ☐ TOPS
- 11. ☐ PROTEON (PRONET)
- 12. ☐ OTHER

10 What is your LAN environment? (check all that apply)

- 1. ☐ 4M TOKEN RING
- 2. ☐ 16M TOKEN RING
- 3. ☐ ARCNET
- 4. ☐ ETHERNET
- 5. ☐ STARLAN
- 6. ☐ FDDI
- 7. ☐ LOCALTALK
- 8. ☐ OTHER

11 Which operating systems do you utilize? (check all that apply)

- 1. ☐ IBM DOS (VSE)
- 2. ☐ UNIX
- 3. ☐ OS/2
- 4. ☐ OS/2 Extended Edition
- 5. ☐ MVS
- 6. ☐ VM
- 7. ☐ VMS
- 8. ☐ XENIX
- 9. ☐ PICK
- 0. ☐ OTHER

12 Please indicate by vendor the number of mainframes/minicomputers installed in your network.

VENDOR	MAINFRAMES A	MINIS B
01. DEC		
02. IBM		
03. AMDAHL		
04. AT&T		
05. BULL HN IS		
06. NCR		
07. DATA GENERAL		
08. WANG		
09. HEWLETT PACKARD		
10. PRIME		
11. TANDEM		
12. UNISYS		
13. CONTROL DATA		
14. OTHER		

13 Please indicate by vendor the number of microcomputers/workstations:

- A. Presently installed in your network.
- B. The approximate quantity you plan to install in the next 12 months.

MICROCOMPUTER/ WORKSTATION/ VENDOR	PRESENTLY INSTALLED A	PLAN TO INSTALL NEXT 12 MONTHS B
01. PCs based on 80286 chip		
02. PCs based on 80386 chip		
03. PCs based on 80486 chip		
04. 8086/8088		
05. Macintosh		
06. RISC-based workstations		
07. UNIX-based workstations		

14 What is your planned PC standard? (check all that apply)

- 1. ☐ EISA
- 2. ☐ MCA
- 3. ☐ NUBUS (MACINTOSH)

15 For which areas outside of the U.S. do you have purchasing influence? (check all that apply)

- 1. ☐ Europe
- 2. ☐ Asia
- 3. ☐ South America
- 4. ☐ Australia
- 5. ☐ Middle East

16 Check ALL that apply in columns A and B

- A) I am presently involved in the purchase process for the following products/services:
- B) I plan to purchase the following products/services in the next 12 months:

Presently Involved A	Plan to Purchase B
01. <input type="checkbox"/>	01. <input type="checkbox"/>
02. <input type="checkbox"/>	02. <input type="checkbox"/>
03. <input type="checkbox"/>	03. <input type="checkbox"/>
04. <input type="checkbox"/>	04. <input type="checkbox"/>
05. <input type="checkbox"/>	05. <input type="checkbox"/>
06. <input type="checkbox"/>	06. <input type="checkbox"/>
07. <input type="checkbox"/>	07. <input type="checkbox"/>
08. <input type="checkbox"/>	08. <input type="checkbox"/>
09. <input type="checkbox"/>	09. <input type="checkbox"/>
10. <input type="checkbox"/>	10. <input type="checkbox"/>
11. <input type="checkbox"/>	11. <input type="checkbox"/>
12. <input type="checkbox"/>	12. <input type="checkbox"/>
13. <input type="checkbox"/>	13. <input type="checkbox"/>
14. <input type="checkbox"/>	14. <input type="checkbox"/>
15. <input type="checkbox"/>	15. <input type="checkbox"/>
16. <input type="checkbox"/>	16. <input type="checkbox"/>

Presently Involved A	Plan to Purchase B	SOFTWARE:
17. <input type="checkbox"/>	17. <input type="checkbox"/>	Network Management
18. <input type="checkbox"/>	18. <input type="checkbox"/>	Micro to Mainframe
19. <input type="checkbox"/>	19. <input type="checkbox"/>	Network Security
20. <input type="checkbox"/>	20. <input type="checkbox"/>	Call Accounting
21. <input type="checkbox"/>	21. <input type="checkbox"/>	Distributed DBMS
22. <input type="checkbox"/>	22. <input type="checkbox"/>	Communications Software
23. <input type="checkbox"/>	23. <input type="checkbox"/>	Applications Software
24. <input type="checkbox"/>	24. <input type="checkbox"/>	Network Operating Systems Software
25. <input type="checkbox"/>	25. <input type="checkbox"/>	EDI Software
26. <input type="checkbox"/>	26. <input type="checkbox"/>	E-Mail Software
27. <input type="checkbox"/>	27. <input type="checkbox"/>	DATA COMMUNICATIONS:
28. <input type="checkbox"/>	28. <input type="checkbox"/>	Modems (over 9.6kbps)
29. <input type="checkbox"/>	29. <input type="checkbox"/>	Modems (under 9.6kbps)
30. <input type="checkbox"/>	30. <input type="checkbox"/>	T-1 Multiplexers
31. <input type="checkbox"/>	31. <input type="checkbox"/>	T-3 Multiplexers
32. <input type="checkbox"/>	32. <input type="checkbox"/>	Fractional T-1 Multiplexers
33. <input type="checkbox"/>	33. <input type="checkbox"/>	Data Switches
34. <input type="checkbox"/>	34. <input type="checkbox"/>	Matrix Switches
35. <input type="checkbox"/>	35. <input type="checkbox"/>	Packet Switches
36. <input type="checkbox"/>	36. <input type="checkbox"/>	Protocol Converters
37. <input type="checkbox"/>	37. <input type="checkbox"/>	Network Management Systems
38. <input type="checkbox"/>	38. <input type="checkbox"/>	Terminal Emulation Boards
39. <input type="checkbox"/>	39. <input type="checkbox"/>	Facsimile Machines
40. <input type="checkbox"/>	40. <input type="checkbox"/>	Diagnostic Test Equipment
41. <input type="checkbox"/>	41. <input type="checkbox"/>	DSU/CSU
42. <input type="checkbox"/>	42. <input type="checkbox"/>	Data Security
43. <input type="checkbox"/>	43. <input type="checkbox"/>	Data Compression Equipment
44. <input type="checkbox"/>	44. <input type="checkbox"/>	Network Adapter Boards
45. <input type="checkbox"/>	45. <input type="checkbox"/>	Microwave
46. <input type="checkbox"/>	46. <input type="checkbox"/>	Messaging Software
47. <input type="checkbox"/>	47. <input type="checkbox"/>	TELECOMMUNICATIONS:
48. <input type="checkbox"/>	48. <input type="checkbox"/>	PBXs (over 1000 lines)
49. <input type="checkbox"/>	49. <input type="checkbox"/>	PBXs (200 - 1000 lines)
50. <input type="checkbox"/>	50. <input type="checkbox"/>	PBXs (under 200 lines)
51. <input type="checkbox"/>	51. <input type="checkbox"/>	Key Systems
52. <input type="checkbox"/>	52. <input type="checkbox"/>	Automatic Call Distributors
53. <input type="checkbox"/>	53. <input type="checkbox"/>	Voice Messaging Systems
54. <input type="checkbox"/>	54. <input type="checkbox"/>	Video Teleconferencing Systems
55. <input type="checkbox"/>	55. <input type="checkbox"/>	SERVICES:
56. <input type="checkbox"/>	56. <input type="checkbox"/>	Switched Voice
57. <input type="checkbox"/>	57. <input type="checkbox"/>	Dedicated Leased Line
58. <input type="checkbox"/>	58. <input type="checkbox"/>	T-1
59. <input type="checkbox"/>	59. <input type="checkbox"/>	T-3
60. <input type="checkbox"/>	60. <input type="checkbox"/>	Digital Data
61. <input type="checkbox"/>	61. <input type="checkbox"/>	Packet Switched
62. <input type="checkbox"/>	62. <input type="checkbox"/>	Centrex
63. <input type="checkbox"/>	63. <input type="checkbox"/>	Central Office Lan
64. <input type="checkbox"/>	64. <input type="checkbox"/>	Satellite
65. <input type="checkbox"/>	65. <input type="checkbox"/>	On-Line Information
		ISDN
		E-Mail
		VSAT

17 Estimated value of networking equipment and services:

A: Which you helped specify, recommend or approve in the last 12 months?

B: Which you plan to help specify, recommend or approve in the next 12 months?

- A
- 1. ☐ \$100 million and over
- 2. ☐ \$50 - \$99.9 mill.
- 3. ☐ \$25 - \$49.9 mill.
- 4. ☐ \$20 - \$24.9 mill.
- 5. ☐ \$10 - \$19.9 mill.
- 6. ☐ \$5 - \$9.9 mill.
- 7. ☐ \$1 - \$4.9 mill.
- 8. ☐ \$500,000 - \$999,999
- 9. ☐ Under \$500,000

18 Estimated gross annual revenue of your entire company/institution: (check one only)

- 1. ☐ over \$10 billion
- 2. ☐ \$1 to \$9.9 bill.
- 3. ☐ \$500 to \$1 bill.
- 4. ☐ \$100 to \$499.9 mill.
- 5. ☐ \$50 to \$99.9 mill.
- 6. ☐ \$10 to \$49.9 mill.
- 7. ☐ \$5 to \$9.9 mill.
- 8. ☐ under \$5 mill.

19 Estimated number of employees for your entire corporation:

- 1. ☐ over 10,000
- 2. ☐ 5,000 - 9,999
- 3. ☐ 2,500 - 4,999
- 4. ☐ 1,000 - 2,499
- 5. ☐ 500 - 999
- 6. ☐ under 500

20 Which of the following ISDN products do you plan to purchase in the next 12 months? (check all that apply)

- 1. ☐ Basic Rate Interface Terminal Adapters
- 2. ☐ Primary Rate Interface Equipment
- 3. ☐ Voice/Data terminals
- 4. ☐ Voice-only terminals
- 5. ☐ Data-only terminals

21 From which of the following vendors will you consider buying your PBX/Central Office Switch? (check all that apply)

A PBX	B COS
A <input type="checkbox"/>	A <input type="checkbox"/>
B <input type="checkbox"/>	B <input type="checkbox"/>
C <input type="checkbox"/>	C <input type="checkbox"/>
D <input type="checkbox"/>	D <input type="checkbox"/>
E <input type="checkbox"/>	E <input type="checkbox"/>
F <input type="checkbox"/>	F <input type="checkbox"/>
G <input type="checkbox"/>	G <input type="checkbox"/>
H <input type="checkbox"/>	H <input type="checkbox"/>
I <input type="checkbox"/>	I <input type="checkbox"/>
J <input type="checkbox"/>	J <input type="checkbox"/>
K <input type="checkbox"/>	K <input type="checkbox"/>
L <input type="checkbox"/>	L <input type="checkbox"/>
M <input type="checkbox"/>	M <input type="checkbox"/>
N <input type="checkbox"/>	N <input type="checkbox"/>
O <input type="checkbox"/>	O <input type="checkbox"/>
P <input type="checkbox"/>	P <input type="checkbox"/>
Q <input type="checkbox"/>	Q <input type="checkbox"/>

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

An IDG Publication

(continued on next column)

Customization obscures benefits

continued from page 6

"The whole point of standards-based anything is that everyone is interoperable," Langlais said. "It's absolutely silly that anyone should have to buy separate standards-based management systems [to manage] different groups of products."

The State University of New York at Buffalo has been using Reston, Va.-based Performance Systems International, Inc.'s (PSI) SNMP management station to manage Wellfleet Communications, Inc. routers and to monitor the basic status, whether up or down, of TCP/IP hosts on the university's internetwork.

"The biggest problem is that SNMP is not sensitive to any protocols except IP," said Stephen Rhen, a network engineer at the school. "It doesn't give you the ability to do anything with [Novell, Inc.'s Internetwork Packet Exchange] or [Digital Equipment Corp.'s Local Area Transport]. You can go to the router and find out the state of the DECnet, but you can't go beyond that to the DECnet node and check its operational status."

Multiprotocol support

Actually, the authors of SNMP say the protocol is not inextricably linked to IP and could become a multiprotocol management platform. Although SNMP originated within the TCP/IP community, the monitoring and control transactions it performs are completely independent of TCP/IP, according to TCP/IP literature. "Because SNMP requires only the

most basic of transport services, it is possible to carry SNMP over virtually any media or protocol stack," the literature states.

Brian Biles, network management product manager at Sun Microsystems, Inc., agreed. "SNMP could be used to manage anything," he said. "It's flexible enough and simple enough to do most things; it's just a matter of where the market takes it."

Xyplex's Stewart said the MIB wars were inevitable at this stage in the evolution of standards-based net management. "Trying

Users tend to have unrealistic expectations about what SNMP can do for them.



to solve this problem up front is the reason OSI net management isn't to the point where it is usable," he said. "SNMP instead took a first shot at standardizing a few things that were usable, such as a way for private extensions."

Epilogue's Auerbach agreed. "The whole purpose of SNMP is to be a learning tool. Do it wrong now so that next time [with Common Management Information Protocol on Open Systems Interconnection] we can do it right."

Vendors agreed that users

tend to have unrealistic expectations about what SNMP can do for them.

"Some people think you can do resource administration or system management — NetView types of things — with SNMP, and that's not part of the technology at this point," Wollongong's Miller said. "SNMP basically defines network monitoring and management from the transport layer down, dealing with how connections get established and how packets are routed."

Managing resources such as mail servers and printers requires enhancements to the SNMP standard that will evolve over time, Miller said.

With MIB extensions mushrooming all over the place, users need to determine how much of the control of SNMP agent products has been embedded in proprietary MIB objects and make sure the SNMP management station they are considering can accommodate such objects.

Most vendors have been putting their specifications for new MIB variables into the public domain so that they can be readily implemented into the various SNMP management systems. However, trying to track all the new extensions and gather them all as fast as they appear is a daunting task.

To help end the MIB wars, the University of Southern California in Los Angeles recently volunteered to serve as a clearinghouse for MIB extensions on the Internet. "That will really build a lot of momentum for private MIB support" by the management station vendors, Langlais said. ▀

Hutcheson talks of EDI's future

continued from page 27

The first thing we did was add more project teams and subcommittees to divide up the task of working on functional areas and provide more places for people to go who wanted to participate. Then we consolidated project teams and subcommittees to eliminate redundancies.

Each of our 10 subcommittees has spawned up to 10 or 15 task groups of five or six people who work on individual items. This is quite different from five years ago, when we had 100 people or more in a room going through an agenda in which there were maybe only one or two things each person was truly interested in.

We have also created things like the procedures review board to ensure some degree of order, because we have so many things going on. This ensures that procedures for developing standards have been followed and a consensus has been reached.

In the future, I envision subcommittees being even more autonomous than they are now, perhaps meeting on their own outside of X12's three yearly

meetings. Several other ANSI committees function like this.

How much leverage does X12 have in the development of global EDI standards?

We have as much or more influence than anyone else. The U.S. delegation to [the United Nations/EDIFACT] has a heck of a lot of say. I'm convinced that if we thought something ought not to happen, it wouldn't happen. If we felt strongly that something should happen, more often than not, it would.

I wouldn't accept the criticism that, in the UN process, the U.S. is just one voice among all Europeans. The process doesn't work that way. It operates much more on a consensus basis, and votes are rarely taken.

Will X12 and EDIFACT standards align?

Definitely. I have established a goal that by the time we publish Version 4 of the X12 standards, which will be sometime in 1994 or 1995, ANSI and EDIFACT will be effectively aligned.

We are working on a plan to make this happen. A key is to make sure U.S. users understand what we are trying to achieve and

[that they] want us to proceed. I think we'll get a consensus, but it's not certain. The view would be beautiful if we were there. The question is whether its worth the pain and the work to get there.

The pain being?

The pain being the conflict and the struggle over gaining a consensus. It will probably mean X12 will have to change some formats, and it will mean the EDIFACT structure will have to change. People throughout the world will have to buy into it.

How has the merger of X12 and industry standards groups, such as the Electronic Data Interchange Association, benefited users?

It eliminates a lot of confusion over the plethora of organizations that are involved in standards making. It eliminates confusion over which standards to purchase, where to purchase them and what versions match those used by your trading partner. Some users have gotten frustrated with EDI because they and [their] trading partners have unknowingly implemented different versions of the same standard from different groups. ▀

New member of DECrouter line

continued from page 2

gle Ethernet and one 56K or 64K bit/sec wide-area link. The new unit replaces the DECrouter 200, which offered many of the same features but was not intended to support DECnet Phase V.

DECrouter 250 software currently supports DECnet Phase IV software and will be upgraded to support DECnet Phase V, which will enable users to take advantage of Open Systems Interconnection-based services such as expanded network node addresses and a global naming facility.

DECrouter 250 software enables users to build into the router least-cost routing tables that instruct it to transmit traffic destined for certain locations over specific wide-area links. The software can also be programmed to route traffic around failed wide-area links.

User gives thumbs up

The new product provides an economical way to link a central DECnet over low-speed lines to DEC routers — or VAXes configured as DECnet routing nodes — that provide access to remote DECnets, according to Philip Demar, network analyst at Batavia,

Ill.-based Fermi National Accelerator Laboratory, a beta-test site for the DECrouter 250.

Demar said the lab has been phasing out older DEC PDP-11-based routers, called DECSAs, and replacing them with DECrouter 2000s that provide higher speed links to large universities and other research nets. However, Fermi Lab has kept a handful of mid-range DECSA routers to support medium-speed links.

"I could have gone on buying DECrouter 2000s to phase out all my DECSAs," he said. "But I've got such a large number of low-speed leased lines here, it's more economical to buy a couple of [DECrouter 250s] that offer eight ports for \$6,000 instead of [DECrouter 2000s] that offer four ports for \$9,000 to \$10,000."

While the DECrouter 250 fills out the DECrouter product line, Demar said DEC has a way to go to compete against third-party router vendors such as Cisco Systems, Inc. and Proteon, Inc. Those vendors supply multiprotocol routers that can route traffic between various vendors' local networks. They also support multiple Ethernet connections and T-1 interfaces.

The DECrouter 250 is available now and costs \$6,000 in any of the three configurations. ▀

Letters

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bit/sec.

■ The network evaluation was performed with only one server. A single server has the effect of serializing the traffic on the network, which throttles the traffic on the network. The network doesn't have the opportunity to show off its high throughput capability.

This type of benchmark is quite good for evaluating servers but is inadequate for evaluating networks. You may argue that the average LAN has only one server. However, that isn't the case in many large user corporations.

Please remember that the bit/sec rating of any network is not a speedometer. An appropriate analogy here is that of an expressway. When traffic is light or there are few entrances and exits, it doesn't make much difference how many lanes the expressway has. But at 5 p.m. in a downtown area with entrances every few hundred yards, I'll choose the 16-lane highway over the four-lane highway every time.

Craig Mellor
Camcom Systems, Inc.
Mt. Clemens, Mich.

Mr. Mellor makes some good points. It's true we would have gotten different results if we'd done the tests as he suggests. The controlling factor was the amount of time required to complete the tests and write up the results.

It's true that early token re-

lease will significantly increase throughput. We mentioned only that using larger packet sizes would increase performance, but early token release is also a significant performance-increasing feature.

It's also true that to maximize the throughput on the wire, multiple servers must be used. However, we were testing the average work group local-area net, which usually does not have multiple servers.

Part of the limit on throughput was the fact that we had a single server. The single server contains several components that contribute overhead to the network request response pathway: file system, disk subsystem, transport- and network-layer protocols, logical link control (LLC) and media access control-layer protocols and device drivers.

There is an alternate way to measure the raw possible throughput on the wire, which was pointed out in the article. To bypass the overhead of the server components, Texas Instruments, Inc., IBM and others have written tests that appeal directly to the LLC layer (International Standards Organization Layer 2). These tests' results show that use of well over 90% of the 4M and 16M bit/sec bandwidth is achievable in memory-to-memory tests between station and server.

Michael Howard
President
Infonetics Research
Institute, Inc.

Lighting co. gains market edge

continued from page 2

our competitors seven years to catch us," said Jeffrey Kernan, vice-president of information and management services at Lithonia.

And others, it seems, would rather join Lithonia than compete against it. Lithonia recently agreed to buy out a Canadian lighting firm, which was eager to get access to Lithonia's extensive product line as well as the customer support capabilities provided by Light*Link.

"Largely because of Light*Link, we've been recognized throughout the industry as a company that's easy to do business with," Kernan said. "That's been our major objective all along."

Light*Link was developed in the early 1980s as a way for Lithonia to foster better working relationships with its independent sales agents.

The company realized that these agents, who have exclusive rights to sell Lithonia products, are the central link in the company's purchasing and distribution chain because they function as the middlemen between Lithonia and buyers of its products.

The business cycle consists of distributors, contractors and specifiers who design commercial building lighting systems, field warehouses and the company.

Light*Link was designed to improve customer service by enabling agents to use terminals to submit orders faster and access on-line information about prices, inventory and the status of orders.

To encourage agencies to convert to electronic order entry, Lithonia rents systems to agencies for a nominal fee and provides training free of charge.

The dial-up Light*Link network now supports 88 independent sales agencies, 45 field warehouses, 2,500 authorized distributors and host processors at Lithonia's headquarters here.

The agencies and field warehouses have 16M bit/sec IBM Token-Ring Networks, which support as many as 30 DOS-based workstations and run Version 2.15 of Novell, Inc.'s NetWare operating system. The local-area networks support Novell Inter-network Packet Exchange (IPX) bridges for asynchronous dial-up communications and IBM Personal System/2 file servers.

Agency systems support a proprietary software package, called Agency Communications Environment + (ACE+), that enables agents to receive quote requests from distributors, generate price quotes on a bill of materials, transmit quotes to distributors and transmit orders to Lithonia.

ACE+ also allows agents to check the status of customer orders and check the availability of inventory on a day-to-day basis in field warehouses and factory distribution centers.

Field warehouses use an application called a Stock Order System, which lets them receive orders directly from distributors or agents and keep track of inventory levels.

Distributors use a stand-alone

DOS workstation to dial into agency systems to request price quotes, and to enter and check the status of orders. A new feature now being tested in a few major metropolitan areas lets distributors directly access field warehouses to check inventory and place orders instead of going through an agent.

Lithonia is upgrading Light*Link as well as its own internal systems to increase functionality and the flow of information internally and externally (see "Lighting company takes a shine to distributed LANs," this page).

Works like a charm

Light*Link plays a pivotal role in Lithonia's sales and distribution strategy because it gives agents the capability to act as if they were regional manufacturers for distributors, Kernan said.

Lithonia lets agents decide what stock to place in the regional warehouses and lets them control the inventory directly. Every time an agent fills an order from warehouse stock, Lithonia automatically ships new merchandise to the warehouse to replenish the inventory.

Every night, Lithonia's mainframes automatically dial the warehouses and download information about inventory status and orders. Lithonia then sends out replenishment shipments the next day or schedules the production of merchandise in a manufacturing division.

"The strategy works like a charm because we have an information link telling us what's going on out there and what to ship to each of the warehouses," Kernan said. □

AT&T unveils SNA/3270 line

continued from page 4

cations for AT&T's Network Systems group.

AT&T also introduced new ISDN terminals and telephone sets at the conference.

The AT&T 6538/9 Display Terminal comes with an internal BRI and supports a single analog telephone.

The terminal supports up to five windows — four for data and one for telephony — enabling users to perform several tasks at the same time through simultaneous

connections to multiple host computers.

The terminal could display the telephone number of a calling party in one window and use the number to initiate a data base query on one of the attached hosts. The customer profile would then be displayed in another window.

ISDN digital phone set

The company also released the ISDN 7506 Integrated Coax Data Module Display Terminal, an ISDN digital telephone set that provides a coaxial 3270 interface and converts coaxial data into a

proprietary AT&T message set for transmission over a BRI link. AT&T is targeting this product at 3270 terminal users that want ISDN voice and data capabilities, Fekerty said.

Another new BRI is the ISDN 3270 Coax Data Module, a stand-alone device that supports two 3270 terminals over a single BRI link.

Lastly, AT&T announced the PC/ISDN Card for IBM Personal Computers. The board provides a BRI and enables a microcomputer to emulate a 3270 terminal and support an ISDN telephone set. □

one choice," said Paul Evenson, vice-president at Tri-Star Communications, Inc., a provider of telecommunications management services. The company recently installed two Teleport T-1 lines. "With the Hinsdale [Ill.] fire and the AT&T outage this year, we've learned that nobody is infallible when it comes to providing service."

Bonney said he is hopeful for a quick decision but added that it is difficult to say when one will be reached. □

Teleport asks PUC to force

continued from page 4

The driving force behind Teleport's decision to expand into California is that the regulatory environment appeared encouraging, Bonney said. The PUC had opened the intra-local access and transport area private-line market to alternative access carriers and had announced pricing flexibility for Pacific Bell and GTE Corp., the area's local access carriers, he said.

"We would never have even been out in California with these two networks if we had not been encouraged by the prior policy statement by the California Public Utilities Commission regarding local competition," Bonney said.

Users contacted by *Network World* spoke in favor of Teleport's filing.

"I don't want to be locked into

Lithonia Lighting takes a shine to distributed LANs

In an effort to bring its internal network up to speed with its Light*Link order entry network, Lithonia Lighting Co. in Conyers, Ga., is replacing the terminal-to-host net currently used to support its seven divisions with a distributed system based on local-area networks.

The new architecture is intended to improve communications among workers and increase the efficiency and coordination of its order fulfillment and stock distribution processes.

"The network will greatly enhance our ability to connect and pass images and other documents to people inside and outside the organization," said Jeffrey Kernan, vice-president of information and management services at Lithonia.

Each company division will have multiple token-ring LANs supporting IBM Personal System/2 workstations and file servers, the same platform used to support distributors and agencies in Light*Link. The LANs will largely replace IBM 3174 terminals currently used to access host applications.

The rings will be connected via 56K bit/sec links to a token-ring backbone at company

headquarters used to support two mainframes. The divisional rings will support product design, purchasing, manufacturing and marketing applications, while Lithonia's mainframes will continue to handle centralized functions such as finance, human resources and distribution.

Lithonia is currently writing a series of distributed applications that incorporate a variety of application program interfaces (API), including Network Basic I/O System and LU 6.2. These APIs will enable Lithonia applications running on DOS workstations, OS/2 file servers and CICS-based mainframes to communicate, according to Kernan.

In addition to improving intracompany communications, the distributed architecture will help Lithonia appear to the commercial lighting market as a single company rather than six loosely controlled divisions with separate product lines, Kernan said.

This "one-company strategy" is needed to facilitate the flow of information from within Lithonia to outside agents, distributors and warehouses.

— Wayne Eckerson

AT&T shows off photonic switch

continued from page 4

Division, said users will demand photonic switching technology.

"Sometimes they know better than we do. Users demanded digital switching when technologists said we could do the job better with analog switching," Lucky said.

AT&T Network Systems will put Free Space Photonics to work first in its evolving line of Synchronous Optical Network-based transmission systems and later in its switching systems.

"We've spent a great deal of time building a digital [long-distance] transport network," said H. Scott Hinton, photonic switching systems department head for AT&T Bell Labs in Naperville, Ill. "Now we can enhance it to support broadband fiber-based services."

Free Space Photonics will increase the capacity of network switches by three magnitudes, according to Hinton. One of AT&T Network System's highest capacity switches, the 5ESS, handles a maximum throughput of 16G bit/sec, while the new technology could support more than 1T bit/sec of throughput, he added.

"It's a long way from being a product, but it's also a long way

from the sterile lab environment," Hinton said of the switching system's core. "We've moved it from a science phase to an engineering phase."

Telecommunications networks employing Free Space Photonics will route information in terabits while today's networks generally move information at only megabit speeds.

“Free Space Photonics is a long way from being a product, but it's also a long way from the sterile lab environment.”

▲▲▲

The vast capacity of Free Space Photonics means that the AT&T public network could simultaneously support hundreds of millions of facsimile connections, hundreds of thousands of videoconferences and high-speed data networks, as well as thousands of HDTV channels, all within seconds, according to AT&T. □

WILL YOUR COMMUNICATION SYSTEM
BE ABLE TO GROW
ALONG WITH YOUR COMPANY?

WILL YOU BE LOCKED OUT OF GLOBAL MARKETS
BECAUSE YOUR NETWORK ISN'T UP TO WORLD STANDARDS?

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WILL YOU BE READY TO HANDLE VIDEO
WHEN USERS DEMAND IT?



**To know for sure,
you'd need a time machine...**

Credit card causes AT&T to lose Citicorp

continued from page 2

service centers, will soon be picking up the bulk of the traffic — a loss for AT&T, which had supplied the majority of the lines. In addition, MCI will provide tail-end circuits that link the data centers with retailers around the country.

"Mostly, it will be taking business away from AT&T," said Nathan Kantor, president of MCI's Northeast division.

MCI rides the wave

Sensing that AT&T may have offended some of its financial services customers with the introduction of its own credit card, MCI has launched an ad campaign targeting the banking industry. The ads, which state, "At MCI, we want your communications business, not your credit card customers," have run in numerous banking trade journals.

Citicorp's credit card business is a solid revenue producer for the company. While Citicorp last week reported a 56% drop in quarterly earnings over last year, its global consumer business — which includes the Card Products Group — rose 26% to a record \$270 million.

"We have five million new cardholders each year," said a Citibank spokeswoman. Inroads from AT&T would have been unwelcomed.

AT&T is working to allay customer fears. "Some of our big financial services

customers are concerned about the competitive threat from us," said an AT&T spokesman. "But we have been talking with them, and we believe they are going to base their telecommunications purchases on our quality, service and price."

The Chase Manhattan Bank, N.A. said that although it recognizes AT&T as a competitor in credit card services, the carrier's move would not affect Chase's decisions on telecommunications purchases.

Chase's purchases are "strictly based on the vendor that provides the best service," a company spokesman said.

AT&T's ubiquitous presence and network offerings position it as an undeniable international player. "Citicorp will probably always be doing business with AT&T" because of AT&T's global scope and expertise, said the Citibank spokeswoman.

In an effort not to be dependent on any one carrier, Citicorp has worked to build relationships with both MCI and AT&T over the years.

Last November, in a calculated effort to balance the distribution of its business, Citicorp awarded MCI a three-year, \$80 million contract for Vnet, satellite and other services. At the same time, the conglomerate signed a three-year, \$43.5 million Tariff 12 deal with AT&T for voice and data services.

Citicorp emphasized that a sizable amount of network-related business still remains to be doled out — even after this week's announcement of the \$30 million contract award to MCI. □

U.S., Europe to investigate int'l rates

continued from page 1

1970s to the late 1980s. By 1988, foreign carriers were collecting roughly \$2 billion more than U.S. carriers for international calls to and from the U.S.

One of the factors contributing to the deficit is that foreign carrier international calling rates are higher than U.S. rates. The FCC is concerned that foreign carrier rates may not be justified by actual operational costs and that foreign governments may be using the huge outflow of U.S. money to subsidize other national operations, such as postal services.

"We've found significant price variations that don't seem to be related to cost," said Ken Stanley, an FCC economist.

One-third of profits

The U.K.'s Office of Telecommunications earlier this month followed the FCC's lead and announced that it, too, is investigating the issue.

The U.K.'s national regulator is examining whether it is proper for the U.K.'s dominant carrier, British Telecommunications PLC, to earn nearly one-third of its more than \$3 billion in annual profits from international switched services, even though international service contributes a much smaller portion of its total revenue.

If the investigation concludes that price gouging is occurring, price cuts or other regulatory changes may be ordered, according to a spokeswoman for the Office of Telecommunications. The investigation should be completed by this summer, she added.

The European Commission jumped into the fray earlier this month by launching investigations into whether Common Market carriers overcharge for international calls and, if so, whether this overcharging is a result of collusion.

Some analysts have suggested that carriers work together, using complicated international rate-setting procedures negotiated under the auspices of the International Telecommunications Union, to establish prices for international calls that far exceed cost.

The effects

In a report issued last month, the Organization for Economic Cooperation Development — a Paris-based think tank supported by 24 leading industrial nations — concluded that these rate-setting schemes penalize carriers in competitive markets for lowering international service prices while rewarding monopoly carriers that keep their rates high ("OECD report compares costs of int'l WAN service," *NW*, March 19).

Most of the world's international carriers

are monopoly service providers.

These rate-setting schemes also limit the ability of carriers to lower the amount a user pays for international calls. Even if U.S. carriers cut international calling prices because of increased competition, monopoly carriers in foreign countries can use the rate-setting systems to continue charging high rates and thus collect the lion's share of user money spent on international calls.

In its 1988 report titled "International Accounting Rates and the Balance of Payments Deficit in Telecommunications Services," the FCC concluded that 75 cents of every dollar that U.S. consumers spend on international calls goes to foreign carriers.

\$10 billion cartel

Fueling the controversy was an investigative article by the London-based *Financial Times* last month that concluded that the world's telephone companies operate like an international cartel and overcharge users more than \$10 billion per year for international calls.

Several regulators and analysts ques-

If the investigation concludes that price gouging is occurring, price cuts or other regulatory changes may be ordered.

▲▲▲

tioned the newspaper's numbers, but regulators in the U.K. and the European Commission said that the publicity stirred up by the article fueled public pressure for the investigations.

Much of the evidence for overcharging stems from the fact that international calls typically cost far more than domestic calls of the same duration and distance. Regulators say there should be some difference, but probably not as much as currently exists.

Users have noticed the inflated cost of international calls and said it limits their ability to do business abroad.

"It costs me more to call [just over the border to] Canada than to Los Angeles," said Thomas O'Toole, director of Communications Systems at Pittsburgh-based Westinghouse Communications.

Regulators are investigating these price differentials in order to gather the comprehensive data needed to justify policy changes. But FCC officials said that even if solid evidence of overcharging is gathered, they are not yet sure what could be done. □

ly true of MCI and US Sprint, which are growing at a double-digit pace, said John Bain, telecommunications analyst at Raymond James & Associates, Inc., a St. Petersburg, Fla.-based investment firm.

"The long-term question for MCI and US Sprint is, how can they keep growing at double-digit rates and still leave room for AT&T to grow?" Bain said.

"I believe AT&T will not tolerate a situation where it is actually losing business volume. In that case, AT&T wouldn't have any choice but to get aggressive with prices, and that would be a disaster for everyone in the industry except for customers," he said. □

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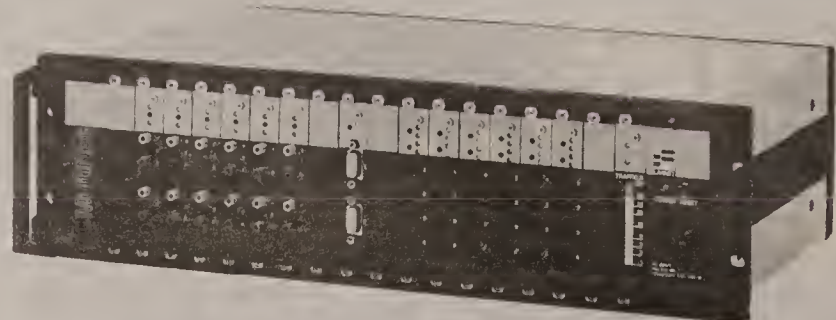
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See The FAXNet Form on Page #67

Big Three say earnings up to snuff

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During the quarter, William Esrey, United Telecom's president and chief executive officer, replaced Paul Henson as chairman. Esrey previously had been elected by United Telecom's board of directors to succeed Henson, who will stay on as a director.

Looking ahead

Industry analysts were pleased by the carriers' results but questioned how long they can stay on this roll. This is particular-



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TECHNOLOGY THE WORLD CALLS ON

Firms work to keep net staff

continued from page 5

"You can keep people challenged because there are daily problems that go beyond any automated system that exists today," said Jeffrey Owen, operations manager for the Corporate Telecommunications Laboratory at Hughes Aircraft Co. in Long Beach, Calif.

Putting expert systems on the trail of low-level alarms — for example, when a modem fails or a line degrades — permits net management operators to spend more time investigating network failures, such as the cause of a T-1 circuit failure.

"It's the small tasks that take a lot of time," Patel said. He added that while expert systems may be ideal for resolving low-level net alarms or alerts, human experts are often better suited to fight the bigger battles.

Jeffrey Cook, first vice-president and manager with Security Pacific Automation Co., Inc. in Glendale, Calif., concurred. "It's going to be hard to teach expert systems to be as smart as the operator who applies human intuition and expertise to get the job done well," Cook said. His firm provides communications and data processing services to Security Pacific National Bank.

Cook said he is confident that experienced network operators will not have to wait around for major problems to occur. He said

networks the size of Security Pacific's, which spans the country, often have the type of problems that keep even the most experienced net operators on their toes.

If-then experts

Expert systems troubleshoot networks by comparing actual net conditions against a series of complex if-then statements stored in a knowledge base. When the system detects a faulty network condition, it initiates the corrective measure based on the if-then responses in its data base.

"If you have deployed an expert system in your network management system, it can automatically respond to certain lower level alarms," Patel said.

Some users may also rely on expert systems to off-load alarm filtering from human operators. The system, they said, can filter alarms coming from multiple network devices to determine which are the most severe. For example, a failed backbone T-1 circuit could cause a chain reaction of alarms from all the data communications and data terminal equipment that rely on that circuit.

The expert system examines each of those alarms until it pinpoints the devices most likely to have caused the failure. Those few alarms are then displayed on the console screen.

However, Owen said he believes that users should keep alarm filtering as a task for human operators because they can perform it more quickly. He said a human operator who has dealt with T-1 circuit failures can watch a flood of alarms scroll across a console screen and quickly notice a pattern that could only be generated by a T-1 circuit failure. Expert systems would have to examine each incoming alarm before reaching the same conclusion.

Users said experienced network operators can also be kept alert by taking on responsibility for deciding what action to take to correct major problems. Faulty logic caused by a limited knowledge base can force an expert system to automatically respond to certain alarms with commands that actually compound the problem.

"[Talented network operators] are better than an expert system will ever be at figuring out what is wrong in a really complex and intricate situation," Cook said. This is why expert systems are better suited for automation of lower level tasks that often tend to bore experienced network operators, he added.

"None of the low-level problems challenge anybody," Cook added. "[Talented net operators] care about solving the complex problems. And those are the problems you're not going to count on your expert system to solve." □

Credit checking co. quits AT&T

continued from page 5

By averaging out different lengths of calls on a common trunk, Comp-U-Check no longer pays for excess time. Through the DNIS system, MCI identifies the last four digits of the 800 number dialed and passes that information along as a prefix. Comp-U-Check's Rolm 9751 private branch exchange reads the four-digit prefix and routes the call to the appropriate station group.

Durbec estimated that the company will save \$48,000 per year by consolidating its 800 traffic onto one trunk group with DNIS. Because it would be impossible to get the efficiencies of the DNIS arrangement with multiple carriers, Comp-U-Check moved all of its traffic to MCI.

But Durbec said he made the switch to MCI over the other two bidders — AT&T and US Sprint Communications Co. — for other reasons as well. For one, MCI had a point of presence about five miles away from Comp-U-Check's existing location, while the other carriers' switches were farther away.

MCI also spent time and resources on designing the new network and continues to provide valuable technical expertise, Durbec said. The redesign "wasn't just a ready-made solution; it was something that developed over series of meetings," he said. □

Calendar

April 27, Toledo, Ohio — 1990 Great Lakes Systems Seminar. Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138; (216) 243-6900.

April 29-May 2, Washington, D.C. — NACHA '90. Contact: National Automated Clearing House Association, P.O. Box 64193, Baltimore, Md. 21264; (703) 742-9190.

April 29-May 3, Orlando, Fla. — The Software 2000 User Group Meeting. Contact: Software 2000, P.O. Box 6000, One Park Center, Hyannis, Mass. 02601.

May 1-2, Washington, D.C. — The Second Annual International Mobile Data Conference. Contact: Waters Information Services, P.O. Box 2248, Binghamton, N.Y. 13902; (607) 772-8086.

May 1-3, San Diego — Total Quality Management Technical Workshop. Contact: The University of New Mexico, College of Engineering, Room 107, Farris Engineering Center, Albuquerque, N.M. 87131; (505) 277-5521.

May 2-3, Washington, D.C. — North American MAP/TOP Users Group Meeting. Contact: MAP/TOP, P.O. Box 1157, 2901 Hubbard, Ann Arbor, Mich. 48106; (313) 769-4456.

May 2-4, Portland, Ore. — Partners in Information. Contact: Oregon Telecommunications Association, Ms. Bobbie Jensen, P.O. Box 4412, Portland, Ore. 97208; (503) 238-5813.

May 3-4, Arlington, Va. — Fundamentals of EDI: Planning for Implementation. Contact: TDCC: The Electronic Data Interchange Association, Suite 550, 225 Reinekers Lane, Alexandria, Va. 22314; (703) 838-8042.

May 6-9, Atlanta — 43rd Annual Information Systems Conference. Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

May 6-11, New Orleans — DECUS U.S. Chapter Spring '90 Seminars and Symposium. Contact: Digital Equipment Computer Users Society, 219 Boston Post Road, BP02, Marlboro, Mass. 01752; (508) 480-3418.

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FAXNeT is a service designed to help readers of *Network World* gather important information via FAX on products and services advertised in *Network World*.

How to Use FAXNeT

Listed below in the FAXNeT Directory are the FAX numbers of participating advertisers in this week's issue of *Network World* and the page number where the ad appears. To use FAXNeT cut out the FAXNeT form and make a copy of the form for each inquiry you want to make. Then just FAX it to the vendor's number listed in the FAXNeT Directory.

Benefits to the *Network World* Reader

FAXNeT is designed to get you product and service information FAST. And, if your request is urgent and requires an immediate response from the vendor just check the "Urgent" Box.

This week's FAXNeT ADVERTISERS

Company	Page
Account-A-Call	16
Fax: 818-846-4136	
All The Fax	55
Fax: 516-829-0558	
Cabletron Systems	26
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Codex Corp.	17
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Farallon Computing	68
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Western Digital	7
Fax: 714-863-9326	

NETWORK WORLD
The Newsweekly of User Networking Strategies

FAXNeT

Attention: Marketing Communications Manager

Subject: This inquiry was generated by a *Network World* reader who is responding via FAX to your advertisement in *Network World*.

Name _____ Title _____

Company/Div _____

Address _____

City _____ State _____ Zip _____

Phone _____ FAX _____

☐ URGENT

Action Requested

- ☐ Request for Sales Call
- ☐ Request for Proposal
- ☐ Request for Information

Purchase Timeframe

- ☐ Within 60 Days
- ☐ Within Six Months
- ☐ Within One Year

Scope of Purchase Responsibility

- ☐ Enterprise Wide
- ☐ Departmental

Purchase Influence/Number of Sites

- ☐ One Site
- ☐ 2-9 Sites
- ☐ 10-20 Sites
- ☐ 21+ Sites

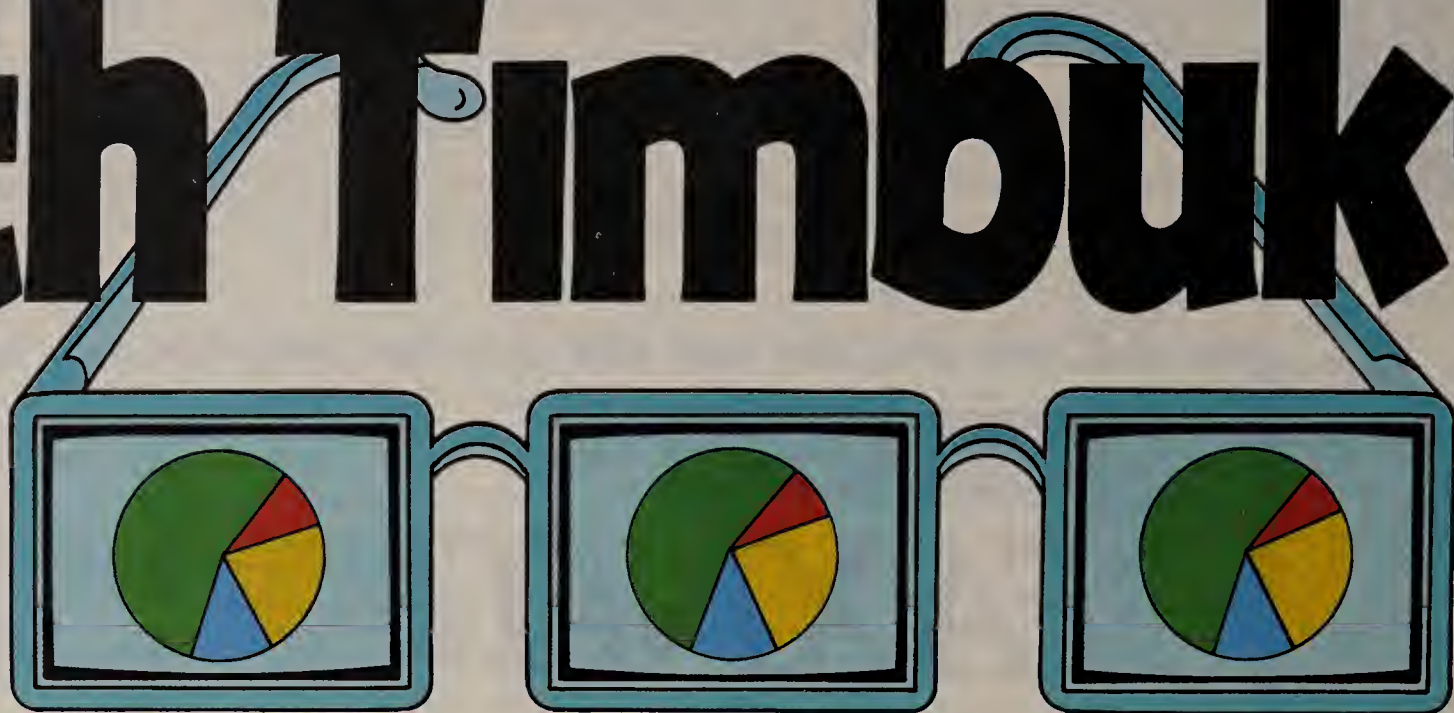
Product

Advertised: _____

Intended

Application: _____

What to do with Timbuktu.



Share screens.

With Timbuktu on every Macintosh, you can invite others to share your point of view. (Advanced password protection ensures privacy.) Sharing screens allows two or more users to work on any document simultaneously. It also allows user support people to help solve users' problems without leaving their desks. Combine Timbuktu with Farallon's network management software, and support people can manage computers and servers from anywhere on the network. Timbuktu/Remote functions similarly to Timbuktu, only over modems or ISDN links.

Share resources.

With Timbuktu installed on each Macintosh throughout the network, you can access any Macintosh and its databases, FAX modems, file or mail servers, or mainframe connections from any Macintosh on the network.

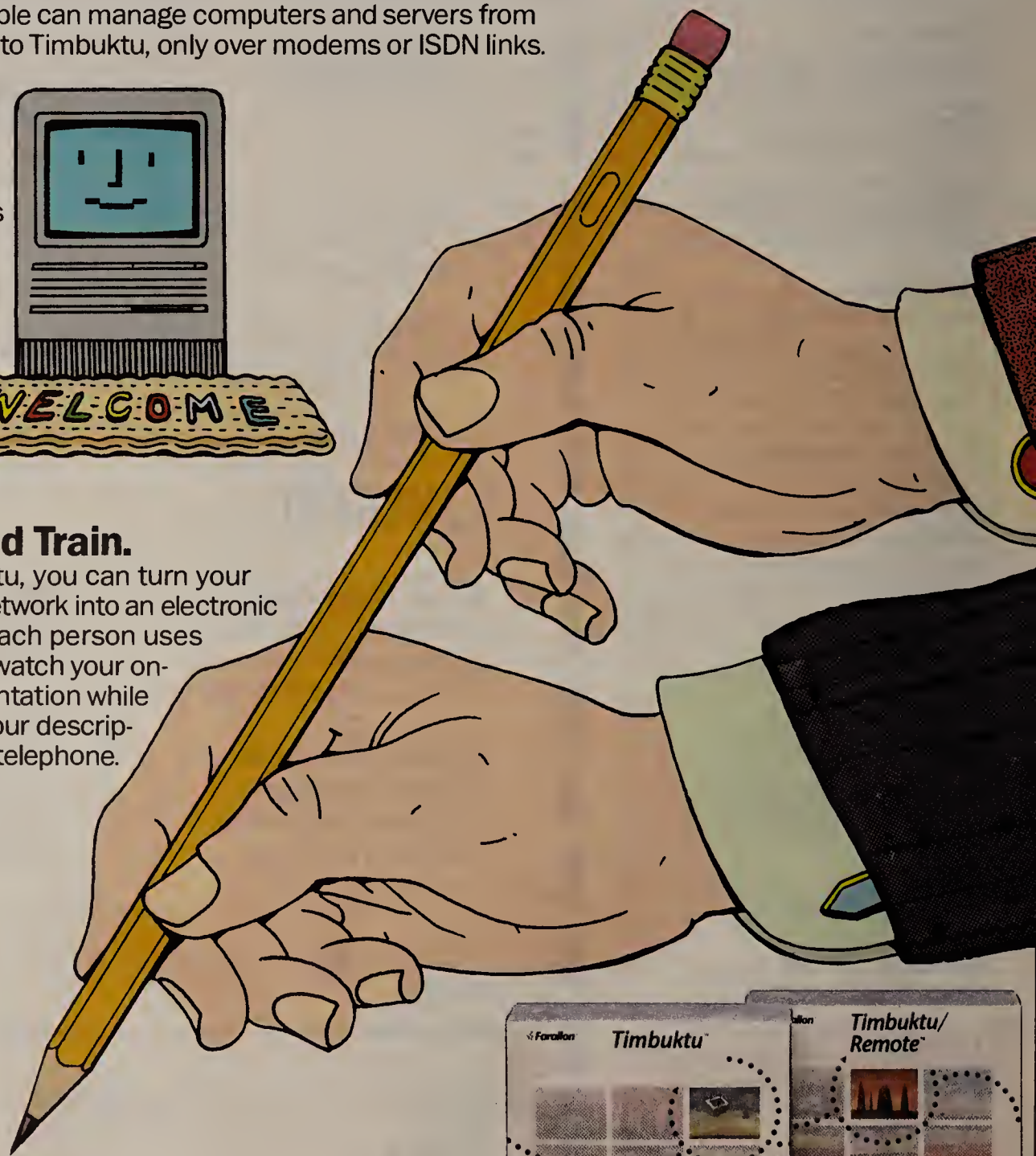
Transfer files.

With Timbuktu 3.0, you can transfer files and folders directly from one Macintosh or file server to any other Macintosh on the network. For a small network, Timbuktu is faster and more cost-effective than other solutions, and for large networks, it's an ideal compliment to a dedicated server.



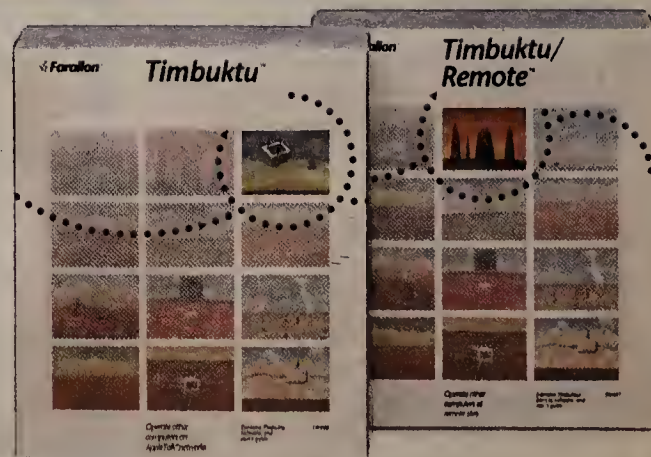
Teach and Train.

With Timbuktu, you can turn your company's network into an electronic classroom. Each person uses Timbuktu to watch your on-screen presentation while listening to your description over the telephone.



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